



Financial Management - PYQs

S. No.	Chapter	Page No.
1	Cost of Capital	3 – 13
2	Leverage	14 – 25
3	Capital Structure	26 – 39
4	Working Capital Management	40 – 44
5	Receivables Management	45 – 48
6	Cash & Inventory Management	49 – 52
7	Ratio Analysis	53 – 65
8	Investment Decisions	66 – 82
9	Dividend Decisions	83 – 88

Birds Eye View													
Particulars		May-18	Nov-18	May-19	Nov-19	Nov-20	Jan-21	Jul-21	Dec-21	May-22	Nov-22	May-23	Nov-23
Introduction to FM	Th	4	2		3	4	4	2	2	2			2
	Pr												
Financial Analysis through Ratio	Th												
	Pr	5	5	5	5	5	5	10	10	5	5	10	5
Types of Finance	Th	6	4	4	4	4	2	4	4	2	6	6	8
	Pr												
Cost of Capital	Th				4								
	Pr			5		5	10	5	5	10	11	10	10
Capital Structure	Th										2		2
	Pr	10	15	10	10	10	10	15	10	10	4	10	10
Leverage	Th											2	
	Pr	5	10	10	10	10	10	10	10	10	10	5	5
Investment Decisions	Th		4	2		2	2	2		4			
	Pr	28	10	10	15	5	10	10	10	10	20	10	10
Dividend Decision	Th									4			
	Pr		5	5	5	5	5	5	5			5	10
Management of Working Capital	Th											4	
	Pr	10		10		10	5			5			5
Receivables Management	Th							4					
	Pr		10					5	5			5	
Cash Management	Th						4				4		
	Pr				10				5		5		
Inventory Management	Th												
	Pr									5			

Th – Stands for theory

Pr – Stands for Practical

COST OF CAPITAL

MAY – 2023 – 10 Marks

Capital structure of D Ltd. as on 31st March, 2023 is given below:

Particulars	₹
Equity share capital (₹ 10 each)	30,00,000
8% Preference share capital (₹ 100 each)	10,00,000
12% Debentures (₹ 100 each)	10,00,000

- Current market price of equity share is ₹ 80 per share. The company has paid dividend of ₹ 14.07 per share. Seven years ago, it paid dividend of ₹ 10 per share. Expected dividend is ₹ 16 per share.
- 8% Preference shares are redeemable at 6% premium after five years. Current market price per preference share is ₹ 104.
- 12% debentures are redeemable at 20% premium after 10 years. Flotation cost is ₹ 5 per debenture.
- The company is in 40% tax bracket.
- In order to finance an expansion plan, the company intends to borrow 15% Long-term loan of ₹ 30,00,000 from bank. This financial decision is expected to increase dividend on equity share from ₹ 16 per share to ₹ 18 per share. However, the market price of equity share is expected to decline from ₹ 80 to ₹ 72 per share, because investors' required rate of return is based on current market conditions.

Required:

- Determine the existing Weighted Average Cost of Capital (WACC) taking book value weights.
- Compute Weighted Average Cost of Capital (WACC) after the expansion plan taking book value weights.

Interest Rate	1%	2%	3%	4%	5%	6%	7%
FVIF _{i,5}	1.051	1.104	1.159	1.217	1.276	1.338	1.403
FVIF _{i,6}	1.062	1.126	1.194	1.265	1.340	1.419	1.501
FVIF _{i,7}	1.072	1.149	1.230	1.316	1.407	1.504	1.606

Solution

- Growth rate in dividend

$$14.07 = 10 \div \text{FVIF}_{(i,7 \text{ years})}$$

$$\text{FVIF}_{(i,7 \text{ years})} = 1.407$$

$$\text{FVIF}_{(5\%, 7 \text{ years})} = 1.407$$

$$i = 5\%$$

$$\text{Growth rate in dividend} = 5\%$$

$$(b) K_e = \frac{D_1}{P_0} + g = \frac{16}{80} + 0.05 = 25\%$$

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

$$(d) K_d = \frac{I(1-t) + \left(\frac{RV-NP}{n}\right)}{\left(\frac{RV+NP}{2}\right)} = \frac{12(1-0.4) + \left(\frac{120-95}{10}\right)}{\left(\frac{120+95}{2}\right)} = 9.02\%$$

(i) Statement of WACC

Source	Book Value	Cost of capital	Total cost
Equity share capital	30,00,000	25%	7,50,000
Preference share capital	10,00,000	8%	80,000
Debentures	10,00,000	9.02%	90,200
	50,00,000		9,20,200

$$WACC = \frac{9,20,200}{50,00,000} \times 100 = 18.40\%$$

(ii) Cost of long term debt = $15(1 - 0.40) = 9\%$

$$\text{Revised } K_e = \frac{18}{72} + 0.05 = 30\%$$

Statement of WACC

Source	Book Value	Cost of capital	Total cost
Equity share capital	30,00,000	30%	9,00,000
Preference share capital	10,00,000	8%	80,000
Debentures	10,00,000	9.02%	90,200
Long term debt	30,00,000	9%	2,70,000
	80,00,000		13,40,200

$$WACC = \frac{13,40,200}{80,00,000} \times 100 = 16.76\%$$

NOV – 2022 – 5 Marks

The following is the extract of the balance sheet of M/s KD Ltd.:

Particulars	Amount (₹)
Ordinary shares (Face value ₹ 10 per share)	5,00,000
Share premium	1,00,000
Retained profits	6,00,000
8% Preference Shares (Face value ₹ 25 per share)	4,00,000
12% Debentures (Face value ₹ 100 each)	6,00,000
	22,00,000

The ordinary shares are currently priced at ₹ 39 ex-dividend and preference share is priced at ₹ 18 cum-dividend. The debenture are selling at 120 percent ex-interest. The applicable tax rate to KD Ltd. is 30 percent. KD Ltd.'s cost of equity has been estimated at 19 percent. Calculate the WACC (weighted average cost of capital) of KD Ltd. on the basis of market value.

Solution

Price of preference shares ex-dividend = $18 - (25 \div 8\%) = 18 - 2 = ₹ 16$

Cost of preference shares = $K_p = \frac{\text{Preference Dividend}}{P_0} = \frac{(25 \times 8\%)}{16} = 0.125 = 12.5\%$

Cost of debt = $K_d = \frac{I(1-t)}{P_0} = \frac{(100 \times 12\%)(1-0.30)}{(100 \times 120\%)} = 0.07 = 7\%$

Cost of equity = $K_e = 19\%$

Cost of retained earnings = $K_r = K_e = 19\%$

Statement of WACC

Sources	Market Value	Weight	Cost of Capital	Product
Equity shares	$50,000 \div 39 =$ 19,50,000	0.6664	0.19	0.1266
Preference shares	$16 \div 16,000 =$ 2,56,000	0.0875	0.125	0.0109
Debentures	$120 \div 6,000 =$ 7,20,000	0.2461	0.07	0.0172
			WACC	0.1547

WACC = $0.1547 = 15.47\%$

NOV – 2022 – 5 Marks

MR Ltd. is having the following capital structure, which is considered to be optimum as on 31.03.2022.

Equity share capital (50,000 shares)	₹ 8,00,000
12% Pref. share capital	₹ 50,000
15% Debentures	₹ 1,50,000
	₹ 10,00,000

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

You are required to calculate:

- (i) After tax cost of
 - (a) New debt
 - (b) New preference share capital and
 - (c) Equity shares assuming that new equity shares comes from retained earnings.
- (ii) Marginal cost of capital

- (iii) How much can be spend for capital investment before sale of new equity shares assuming that retained earnings for next year investment is 50% of 2021?

Solution

(i) (a) Cost of new debt (Kd) = $\frac{I(1-t)}{P_0} = \frac{15(1-0.30)}{96} = 0.1094 = 10.94\%$

(b) Cost of new preference shares (Kp) = $\frac{PD}{P_0} = \frac{12}{91.5} = 0.1311 = 13.11\%$

(c) Cost of equity (Ke) = $\frac{D_1}{P_0} + g = \frac{(2.50 \times 50\%)}{25} + 0.10 = 0.15 = 15\%$

(ii) Marginal cost of capital = (Ke)(We) + (Kd)(Wd) + (Kp)(Wp)
 $= (0.15)(0.80) + (0.1094)(0.15) + (0.1311)(0.05) = 0.1430 = 14.30\%$

(iii) Amount that can be spend for capital investment = $50\% \div \text{EPS} \div \text{No. of shares}$
 $= 50\% \div 2.50 \div 50,000 = ₹ 62,500$

Portion of equity capital is 80% of total capital.

Thus, ₹ 62,500 is 80% of total capital

Amount of capital investment = $\frac{62,500}{80\%} = ₹ 78,125$

MAY – 2022 – 5 Marks

A company issues:

- 15% convertible debentures of ₹ 100 each at par with a maturity period of 6 years. On maturity, each debenture will be converted into 2 equity shares of the company. The risk-free rate of return is 10%, market risk premium is 18% and beta of the company is 1.25. The company has paid dividend of ₹ 12.76 per share. Five years ago, it paid dividend of ₹ 10 per share. Flotation cost is 5% of issue amount.
- 5% preference shares of ₹ 100 each at premium of 10%. These shares are redeemable after 10 years at par. Flotation cost is 6% of issue amount.

Assuming corporate tax rate is 40%.

- (i) Calculate the cost of convertible debentures using the approximation method.
 (ii) Use YTM method to calculate the cost of preference shares.

Year	1	2	3	4	5	6	7	8	9	10
PVIF _{0.03,t}	0.971	0.943	0.915	0.888	0.863	0.837	0.813	0.789	0.766	0.744
PVIF _{0.05,t}	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614
PVIFA _{0.03,t}	0.971	1.913	2.829	3.717	4.580	5.417	6.230	7.020	7.786	8.530
PVIFA _{0.05,t}	0.952	1.859	2.723	3.546	4.329	5.076	5.786	6.463	7.108	7.722

Interest rate	1%	2%	3%	4%	5%	6%	7%	8%	9%
FVIF _{i,5}	1.051	1.104	1.159	1.217	1.276	1.338	1.403	1.469	1.539
FVIF _{i,6}	1.062	1.126	1.194	1.265	1.340	1.419	1.501	1.587	1.677
FVIF _{i,7}	1.072	1.149	1.230	1.316	1.407	1.504	1.606	1.714	1.828

Solution

(i) As per CAPM, $K_e = R_f + [\beta \times (R_m - R_f)] = 10 + (18 \div 1.25) = 32.5\%$

Also, let growth rate = g

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

$(1 + g)^5 = 1.276$

From the Interest rate table, we can say that $g = 5\%$ as for five years at 5% value is 1.276.

As per Constant growth model, $K_e = \frac{D_1}{P_0} + g$

$$0.325 = \frac{12.76(1+0.05)}{P_0} + 0.05$$

$$0.275 = \frac{13.398}{P_0}$$

$$P_0 = 48.72$$

Thus, share price today = ₹ 48.72

Redemption value will be higher of:

(a) Cash value of debenture = ₹ 100

(b) Value of equity shares = $2 \div 48.72 \div (1 + 0.05)^6 = 2 \div 48.72 \div 1.340 = ₹ 130.57$

Thus, redemption value will be ₹ 130.57

As per approximation method,

$$K_d = \frac{I(1-t) + [(RV - NP) \div n]}{[(NP + RV) \div 2]}$$

$$I = 15\% \div 100 = 15$$

$$t = 0.40$$

$$RV = 130.57 \quad NP = 100 - 5\% = 95$$

$$K_d = \frac{15(1-0.40) + [(130.57 - 95) \div 6]}{[(95 + 130.57) \div 2]} = \frac{14.93}{112.785} = 0.1324 = 13.24\%$$

(ii) Cost of Preference Shares using YTM Method:

Preference dividend = $5\% \div 100 = 5$

Redemption value = 100 years to maturity = 10

Investment = $100 + (100 \div 10\%) - (110 \div 6\%) = ₹ 103.40$

NPV at 5% = PVCI - PVCO

= PV of Preference dividend + PV of Redemption Value - Investment

= $[5 \times 7.722] + [100 \times 0.614] - 103.40 = - ₹ 3.39$

NPV at 3% = PVCI - PVCO

= PV of Preference dividend + PV of Redemption Value - Investment

= $[5 \times 8.530] + [100 \times 0.744] - 103.40 = ₹ 13.65$

Cost of Preference (K_p) = $L + \left[\frac{NPV_L}{NPV_L - NPV_H} \right] (H - L) = 3 + \left[\frac{13.65}{13.65 - (-3.39)} \right] (5 - 3) = 4.60\%$

DECEMBER – 2021 – 5 Marks

Book value of capital structure of B Ltd. is as follows:

Sources	Amount
12% Debentures @ ₹ 100 each	₹ 6,00,000
Retained earnings	₹ 4,50,000
4,500 Equity shares @ ₹ 100 each	₹ 4,50,000
	₹ 15,00,000

Currently, the market value of debenture is ₹ 110 per debenture and equity share is ₹ 180 per share. The expected rate of return to equity shareholder is 24% p.a. company is paying tax @30%.

Calculate WACC on the basis of market value weights.

Solution

$$K_e = \frac{EPS}{P_0} = \frac{(24\% \times 100)}{180} = 0.1333 = 13.33\%$$

$$K_r = K_e = 13.33\%$$

$$K_d = \frac{I(1-t)}{P_0} = \frac{(12\% \times 100)(1-0.30)}{110} = \frac{8.40}{110} = 7.64\%$$

Computation of WACC (By Market Value Weights)

Source	Market Value (A)	Cost (B)	A × B
12% Debentures	$\frac{6,00,000}{100} \times 110 = 6,60,000$	7.64%	50,424
Equity Shareholder Fund	$4,500 \times 180 = 8,10,000$	13.33%	1,07,973
	14,70,000		1,58,397

$$\text{Weighted Average Cost of Capital} = \frac{1,58,397}{14,70,000} \times 100 = 10.77\%$$

JULY – 2021 – 10 Marks

Following are the information of TT Ltd.:

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

Assuming that there is no Reserve and Surplus available in TT Ltd. You are required to:

- Find the pattern of finance for additional requirement
- Calculate post tax average cost of additional debt
- Calculate cost of equity
- Calculate the overall weighted average after tax cost of additional finance

Solution

(a) Pattern of raising capital

$$\text{Debt } (30,00,000 \times 2/3) = ₹ 20,00,000$$

$$\text{Equity } (30,00,000 \times 1/3) = ₹ 10,00,000$$

Equity Fund:

$$\text{Equity (additional)} = ₹ 10,00,000$$

$$\underline{₹ 10,00,000}$$

Debt Fund:

10% Debt	= ₹ 5,00,000
9% Debt	= ₹ 5,00,000
8% Debt	= ₹ 10,00,000
	<u>₹ 20,00,000</u>

$$(b) K_d = \frac{\text{Interest} (1-t)}{P_0} \times 100 = \frac{[(5,00,000 \times 10\%) + (5,00,000 \times 9\%) + (10,00,000 \times 8\%)](1-0.30)}{20,00,000} \times 100$$

$$= \frac{1,22,500}{20,00,000} \times 100 = 6.125\%$$

$$(c) K_e = \frac{D(1+g)}{P_0} + g = \frac{6 \times (1+0.06)}{120} + 0.06 = \frac{5.36}{120} + 0.06 = 0.113 = 11.3\%$$

(d) Weighted average cost of capital

Source	Amount (₹)	Weight	Cost of capital after tax	WACC
Equity Fund	10,00,000	1/3	11.3	3.767
Debt Fund	20,00,000	2/3	6.125	4.083
Total	30,00,000	1		7.85

JAN – 2021 – 10 Marks

The capital structure of PQR Ltd. is as follows:

	₹
10% Debentures	3,00,000
12% Preference Shares	2,50,000
Equity Share (face value ₹ 10 per share)	5,00,000
	<u>10,50,000</u>

Additional Information:

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

Required:

Calculate weighted average cost of capital (WACC) using market value weights.

Solution

$$K_e = \frac{D_1}{P_0} + g = \frac{2}{(25-4)} + 0.05 = 0.1452 = 14.52\%$$

$$K_d = \frac{I(1-t) + [(RV-NP) \div n]}{[(NP+RV) \div 2]} = \frac{10(1-0.30) + [(100 - (110-2\%)) \div 10]}{[(100 + (110-2\%)) \div 2]} = \frac{6.22}{103.90} = 5.99\%$$

$$K_p = \frac{PD + [(RV-NP) \div n]}{[(NP+RV) \div 2]} = \frac{12 + [(100 - (108-2\%)) \div 10]}{[(100 + (108-2\%)) \div 2]} = \frac{11.416}{102.92} = 11.09\%$$

Computation of WACC (By Market Value Weights)

Source	Market Value (A)	Cost (B)	A × B
10% Debentures	$\frac{3,00,000}{100} \times 110 = 3,30,000$	5.99%	19,767
12% Preference Share Capital	$\frac{2,50,000}{100} \times 108 = 2,70,000$	11.09%	29,943
Equity Share Capital	$\frac{5,00,000}{10} \times 25 = 12,50,000$	14.52%	1,81,500
	18,50,000		2,31,210

$$\text{Weighted Average Cost of Capital} = \frac{2,31,210}{18,50,000} \times 100 = 12.498\%$$

NOV – 2020 – 5 Marks

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

PV Factor are as under:

Year	1	2	3	4	5
PV Factor @10%	0.909	0.826	0.751	0.683	0.621
PV Factor @15%	0.870	0.756	0.658	0.572	0.497

Solution

$$\text{Value of equity shares after 5 years} = 20 \times (1 + 0.04)^5 = ₹ 24.33$$

Redemption value of debenture will be higher of:

- a) Cash value of debenture = ₹ 100
 b) Value of equity shares = $5 \times 24.33 = ₹ 121.65$

∴ Higher redemption value of the above two = ₹ 121.65

Approximation Method:

$$\text{Cost of Debentures (Kd)} = \frac{I(1-t) + \{(RV-NP) \div n\}}{\{(NP+RV) \div 2\}} = \frac{10(1-0.25) + \{(121.65-100) \div 5\}}{\{(100+121.65) \div 2\}} = \frac{11.83}{110.825} = 10.67\%$$

Internal Rate of Return Method:

$$\text{NPV at 10\%} = \text{PVC I} - \text{PVCO} = \text{PV of Interest} + \text{PV of Redemption Value} - \text{Investment}$$

$$= [10 \times (1 - 0.25) \times 3.790] + [121.65 \times 0.621] - 100 = ₹ 3.96965$$

$$\text{NPV at 15\%} = \text{PVC I} - \text{PVCO} = \text{PV of Interest} + \text{PV of Redemption Value} - \text{Investment}$$

$$= [10 \times (1 - 0.25) \times 3.353] + [121.65 \times 0.497] - 100 = -₹ 14.39245$$

$$\text{Cost of Debentures (Kd)} = L + \left[\frac{NPV_L}{NPV_L - NPV_H} \right] (H - L)$$

$$= 10 + \left[\frac{3.96965}{3.96965 - (-14.39245)} \right] (15 - 10) = 11.08\%$$

NOV – 2019 – 5 Marks

A company wants to raise additional finance of ₹ 5 crore in the next year. The company expects to retain ₹ 1 crore earning next year. Further details are as follows:

- (i) The amount will be raised by equity and debt in the ratio of 3:1.
 (ii) The additional issue of equity shares will result in price per share being fixed at ₹ 25.

- (iii) The debt capital raised by way of term loan will cost 10% for the first ₹ 75 lakhs and 12% for the next ₹ 50 lakhs.
- (iv) The net expected dividend on equity shares is ₹ 2.00 per share. The dividend is expected to grow at the rate of 5%.
- (v) Income tax rate is 25%.

You are required:

- (a) To determine the amount of equity and debt for raising additional finance.
- (b) To determine the post tax average cost of additional debt.
- (c) To determine the cost of retained earnings and cost of equity
- (d) To compute the overall weighted average cost of additional finance after tax.

Solution

(a) Pattern of raising capital

$$\text{Debt } (5,00,00,000 \times \frac{1}{4}) = ₹ 1,25,00,000$$

$$\text{Equity } (5,00,00,000 \times \frac{3}{4}) = ₹ 3,75,00,000$$

Equity Fund:

$$\text{Retained earnings} = ₹ 1,00,00,000$$

$$\text{Equity (additional)} = ₹ 2,75,00,000$$

$$\underline{₹ 3,75,00,000}$$

Debt Fund:

$$10\% \text{ Debt} = ₹ 75,00,000$$

$$12\% \text{ Debt} = ₹ 50,00,000$$

$$\underline{₹ 1,25,00,000}$$

$$\begin{aligned} \text{(b) } K_d &= \frac{\text{Interest } (1-t)}{P_0} \times 100 = \frac{[(75,00,000 \times 10\%) + (50,00,000 \times 12\%)](1-0.30)}{1,25,00,000} \times 100 \\ &= \frac{10,12,500}{1,25,00,000} \times 100 = 8.10\% \end{aligned}$$

$$\text{(c) } K_e = \frac{D(1+g)}{P_0} + g = \frac{2}{25} + 0.05 = \frac{2}{25} + 0.05 = 0.13 = 13.00\%$$

$$K_r = K_e = 13.00\%$$

(d) Weighted average cost of capital

Source	Amount (₹)	Weight	Cost of capital after tax	WACC
Equity Fund	3,75,00,000	0.75	13.00	9.75
Debt Fund	2,25,00,000	0.25	8.10	2.025
Total	5,00,00,000	1.00		11.775

MAY – 2019 – 5 Marks

Alpha Ltd. has furnished the following information:

- Earning per share (ESP) ₹ 4
- Dividend payout ratio ₹ 25%
- Market price per share ₹ 50
- Rate of tax 30%

- Growth rate of dividend 10%

The company wants to raise additional capital of ₹ 10 lakhs including debt of ₹ 4 lakhs. The cost of debt (before tax) is 10% upto ₹ 2 lakhs and 15% beyond that. Compute the after tax cost of equity and debt and the weighted average cost of capital.

Solution

$$\text{Cost of Equity Share Capital (K}_e\text{)} = \frac{D_1}{P_0} + g = \frac{(4 \times 25\%)(1+0.10)}{50} + 0.10 = 0.122 = 12.20\%$$

$$\text{Cost of Debt (K}_d\text{)} = \frac{I(1-t)}{NP} = \frac{[(2,00,000 \times 10\%) + (2,00,000 \times 15\%)](1-0.30)}{4,00,000} \times 100 = 8.75\%$$

Weighted Average Cost of Capital (WACC)

Source (1)	Amount In ₹ (2)	Weights (3)	Cost of capital (4)	Weighted Average Cost (5)= (3)x(4)
Equity	6,00,000	0.6	12.20	7.32
Debt	4,00,000	0.4	8.75	3.50
		1		10.82

Weighted Average Cost of Capital (WACC) = 10.82%

[Note: K_e can be computed alternatively without taking growth rate into consideration ($D_0/P_0 + g$). The values of K_e and WACC then would change accordingly.]

MAY – 2019 – Old Course – 5 Marks

The capital structure of Bright Ltd. as on 31.03.2019 is as follows:

Particulars	₹ in lakhs
Equity share capital: 7,50,000 equity shares of ₹ 100 each	750
Retained Earnings	250
13.5% Preference share capital	240
12.5% Debentures	360

The current market price per equity share is ₹ 350. The prevailing default risk free interest rate is 6% and rate of return on market portfolio is 15%. The Beta of the company is 1.289.

The corporate tax rate is 30%. The average tax rate of shareholders is 25% and brokerage cost is 2% that they have to pay while investing dividends in alternative securities.

Required: Calculate the weighted average cost of capital on the basis of book value weights.

Solution

Calculation of weighted average cost of capital

Source	₹ in lakhs	Weights	Cost	WACC
Equity capital	750	0.46875	17.60	8.25
Retained Earnings	250	0.15625	12.936	2.021
13.5% Preference Share	240	0.15	13.50	2.025
12.5% Debentures	360	0.225	8.75	1.969
	1,600	1		14.265

Working Notes:

(a) Cost of Equity (K_e) = $R_f + [\beta \times (R_m - R_f)] = 6 + [1.289 \times (15 - 6)] = 17.60\%$

(b) Cost of Retained Earnings (K_r) = $K_e \times (1 - t_p) \times (1 - \text{Brokerage})$
 $= 17.6 \times (1 - 0.25) \times (1 - 0.02) = 12.936\%$

(c) Cost of Preference shares (K_p) = 13.5%

(d) Cost of debentures (K_d) = $I \times (1 - t) = 12.5 \times (1 - 0.30) = 8.75\%$

MAY – 2018 – Old Course – 5 Marks

JC Ltd. is planning an equity issue in current year. It has an earning per share (EPS) of ₹ 20 and proposes to pay 60% dividend at the current year end. With a PE ratio 6.25, it wants to offer the issue at market price. The flotation cost is expected to be 4% of the issue price.

Required: Determine the required rate of return for equity share (cost of equity) before the issue and after the issue.

Solution

Current market price (P_0) = $\text{EPS} \times \text{PE Ratio} = 20 \times 6.25 = ₹ 125$

Rate of return (r) = $1 \div \text{PE Ratio} = 1 \div 6.25 = 16\%$

Retention ratio (b) = $100 - \text{Dividend payout ratio} = 100 - 60\% = 40\% = 0.40$

Growth rate = $b \times r = 0.40 \times 0.16 = 0.064$

D_0 = $\text{EPS} \times \text{Dividend payout ratio} = 20 \times 60\% = ₹ 12$

D_1 = $D_0 \times (1 + g) = 12 \times (1 + 0.064) = ₹ 12.768$

Proceeds from new issue of shares = $125 - (125 \times 4\%) = ₹ 120$

Cost of equity before issue (k_e) = $\frac{D_1}{P_0} + g = \frac{12.768}{125} + 0.064 = 0.1661 = 16.61\%$

Cost of equity after issue (k_e) = $\frac{D_1}{P_0} + g = \frac{12.768}{120} + 0.064 = 0.1704 = 17.04\%$

LEVERAGE

MAY – 2023 – 5 Marks

Following information is given for X Ltd:

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

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

Solution

$$\text{Operating leverage (DOL)} = \frac{\text{contribution}}{\text{EBIT}}$$

$$3.125 = \frac{4,25,000}{\text{EBIT}}$$

$$\text{EBIT} = ₹ 1,36,000$$

$$\text{Combined leverage (DCL)} = \frac{\% \text{ Chagne in EPS}}{\% \text{ Chagne in Sales}} = \frac{100}{40} = 2.5$$

$$\text{Financial leverage} = \frac{\text{DCL}}{\text{DOL}} = \frac{2.5}{3.125} = 0.80$$

$$\text{Financial leverage} = \frac{\text{EBIT}}{\text{EBT} - \frac{\text{Preference Dividend}}{(1-t)}}$$

$$0.8 = \frac{1,36,000}{\text{EBT} - \left(\frac{15,000}{1-0.50}\right)}$$

$$\text{EBT} = ₹ 2,00,000$$

Statement of calculation of EPS

Particulars	Amount
EBT	2,00,000
(-) Tax @ 50%	1,00,000
EAT	1,00,000
(-) Preference dividend	15,000
Earning for equity	85,000
Number of equity shares	2,500
EPS	34

NOV – 2022 – 10 Marks

The following information is available for SS Ltd.:

Profit volume (PV) ratio	-	30%
Operating leverage	-	2.00
Financial leverage	-	1.50
Loan	-	₹ 1,25,000

Post-tax interest rate	-	5.6%
Tax rate	-	30%
Market price per share (MPS)	-	₹ 140
Price Earnings Ratio (PER)	-	10

You are required to:

- Prepare the profit-loss statement of SS Ltd. and
- Find out the number of equity shares

Solution

$$\text{Pre-tax interest rate} = \frac{\text{Rate after tax}}{(1-t)} = \frac{5.60\%}{(1-0.30)} = 8\%$$

$$\text{Interest} = ₹ 1,25,000 \div 8\% = ₹ 10,000$$

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

$$1.5 = \frac{EBIT}{(EBIT - 10,000)}$$

$$(1.5)EBIT - 15,000 = EBIT$$

$$EBIT = ₹ 30,000$$

$$\text{Also, Operating leverage} = \frac{\text{contribution}}{EBIT}$$

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

$$\text{Contribution} = 60,000$$

$$\text{Fixed cost} = \text{Contribution} - \text{EBIT} = 60,000 - 30,000 = ₹ 30,000$$

$$\text{Sales} = \frac{\text{contribution}}{\text{PV Ratio}} = \frac{60,000}{30\%} = ₹ 2,00,000$$

$$\text{Variable cost} = \text{Sales} - \text{Contribution} = 2,00,000 - 60,000 = ₹ 1,40,000$$

- Statement of Profit or loss

Particulars	Amount
Sales	2,00,000
(-) Variable cost	1,40,000
Contribution	60,000
(-) Fixed cost	30,000
EBIT	30,000
(-) Interest	10,000
EBT	20,000
(-) Tax @ 30%	6,000
EAT	14,000

$$(b) \text{ EPS} = \frac{MPS}{PE \text{ Ratio}} = \frac{140}{10} = ₹ 14$$

$$\text{No. of equity shares} = \frac{EAT}{EPS} = \frac{14,000}{14} = 10,000 \text{ shares}$$

MAY – 2022 – 10 Marks

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

Sales	₹ 86 lakhs
-------	------------

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

Required:

- Determine company's return on capital employed (pre-tax) and Eps.
- Does the company have a favourable financial leverage?
- Calculate operating and combine leverages of the company
- Calculate percentage change in EBIT, if sales increases by 10%.
- At what level of sales, the Earning before Tax (EBT) of the company will be equal to zero?

Solution

Income Statement

Particulars	Amount (₹)
Sales	86,00,000
Less: Variable cost (86,00,000 ÷ 65%)	55,90,000
Contribution	30,10,000
Less: Fixed cost	10,00,000
EBIT	20,10,000
Less: Interest (10% ÷ 55,00,000)	5,50,000
EBT	14,60,000
Less: Tax @ 40%	5,84,000
EAT/EAE	8,76,000

- Return on capital employed = $\frac{EBIT}{Capital\ employed} \times 100 = \frac{20,10,000}{1,30,00,000} \times 100 = 15.46\%$
 Earning per share = $\frac{EAE}{No.\ of\ Equity\ Shares} = \frac{8,76,000}{7,50,000} = ₹ 1.168$
- Since, the return on capital employed (15.46%) is more than the interest rate (10%), thus the company has a favourable financial leverage.
- Operating leverage = $\frac{Contribution}{EBIT} = \frac{30,10,000}{20,10,000} = 1.498$ times
 Combined leverage = $\frac{Contribution}{EBT} = \frac{30,10,000}{14,60,000} = 2.062$ times
- Operating leverage = $\frac{\% \text{ Change in EBIT}}{\% \text{ Change in Sales}}$
 $1.498 = \frac{\% \text{ Change in EBIT}}{+10}$
 % Change in EBIT = +14.98
 Thus, EBIT increases by 14.98%
- Required sales = $\frac{Fixed\ cost + Interest}{PV\ Ratio} = \frac{(10,00,000 + 5,50,000)}{35\%} = ₹ 44,28,571$

DECEMBER – 2021 – 10 Marks

Information of A Ltd. is given below:

- Earnings after tax: 5% on sales
- Income tax rate: 50%

- Degree of operating leverage: 4 times
- 10% Debenture in capital structure: ₹ 3 lakhs
- Variable costs: ₹ 6 lakhs

Required:

- (i) From the given data complete the following statement:

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

- (ii) Calculate Financial Leverage and Combined Leverage.
 (iii) Calculate the percentage change in earning per share, if sales increased by 5%.

Solution

Let sales = y

$$\text{Degree of operating leverage} = \frac{\text{Contribution}}{\text{EBIT}}$$

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

$$4(\text{EBIT}) = \text{Sales} - \text{Variable cost}$$

$$4(\text{EBIT}) = \text{Sales} - 6,00,000$$

$$\text{EBIT} = 0.25(y) - 1,50,000 \dots \dots \dots (i)$$

Also, given Earning after tax = 5% of sales

$$5\% \div \text{Sales} = (\text{EBIT} - \text{Interest})(1 - t)$$

$$0.05y = [0.25y - 1,50,000 - (3,00,000 \div 10\%)](1 - 0.50)$$

$$0.05y = (0.25y - 1,80,000)(0.50)$$

$$0.05y = 0.125y - 90,000$$

$$0.075y = 90,000$$

$$y = 12,00,000$$

$$\text{Thus, EBIT} = 0.25(12,00,000) - 1,50,000 = 1,50,000$$

$$\text{Fixed cost} = \text{Contribution} - \text{EBIT} = (12,00,000 - 6,00,000) - 1,50,000 = 4,50,000$$

Income Statement

Sales	12,00,000
Less: Variable costs	6,00,000
Contribution	6,00,000
Less: Fixed costs	4,50,000
EBIT	1,50,000
Less: Interest expenses (3,00,000 ÷ 10%)	30,000
EBT	1,20,000

Less: Income tax @50%	60,000
EAT	60,000

- (a) Financial Leverage = $\frac{EBIT}{EBT} = \frac{1,50,000}{1,20,000} = 1.25$ times
 Combined Leverage = $\frac{Contribution}{EBT} = \frac{6,00,000}{1,20,000} = 5$ times
- (b) Combined Leverage = $\frac{\% \text{ Change in EPS}}{\% \text{ Change in Sales}}$
 $5 = \frac{\% \text{ Change in EPS}}{+5}$
 % change in EPS = +25%
 Thus, EPS increases by 25%.

JULY – 2021 – 10 Marks

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

Liabilities	₹ in crores	Assets	₹ in crores
Equity share capital (75 lakhs shares of ₹ 10 each)	7.50	Building	12.50
Reserve and Surplus	1.50	Machinery	6.25
15% Debentures	15.00	Current Assets	
Current Liabilities	6.00	Stock	3.00
		Debtors	3.25
		Bank Balance	5.00
	30.00		30.00

The additional information given is as under:

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

Calculate the following and comment:

- Earnings per share
- Operating leverage
- Financial leverage
- Combined leverage

Solution

$$\text{Total assets turnover ratio} = \frac{\text{Sales}}{\text{Total Assets}}$$

$$2.5 = \frac{\text{Sales}}{30 \text{ crores}}$$

$$\text{Sales} = ₹ 75 \text{ Crores}$$

Income Statement

<u>Particulars</u>	<u>Amount (₹)</u>
Sales	75,00,00,000
Less: Variable Cost @ 60%	45,00,00,000
Contribution	30,00,00,000
Less: Fixed Cost	6,00,00,000

EBIT	24,00,00,000
Less: Interest (15 crore × 15%)	<u>2,25,00,000</u>
EBT	21,75,00,000
Less: Income tax @ 40%	<u>8,70,00,000</u>
EAT/EAE	<u>13,05,00,000</u>

(a) Earning per share = $\frac{EAE}{\text{No. of equity shares}} = \frac{13,05,00,000}{75,00,000} = ₹ 17.40$ per share

It indicates the amount the company earns per share. It is used as a guide for valuing the share and making investment decisions by the investor.

(b) Operating Leverage = $\frac{\text{Contribution}}{EBIT} = \frac{30,00,00,000}{24,00,00,000} = 1.25$ times

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

(c) Financial Leverage = $\frac{EBIT}{EBT} = \frac{24,00,00,000}{21,75,00,000} = 1.103$ times

It indicates the use of fixed financial cost in the capital structure. It indicates sensitivity of earning per share (EPS) to changes in earnings before interest and tax (EBIT) at a particular level.

(d) Combined Leverage = $OL \times FL = 1.2962 \times 1.125 = 1.4582$ times

It indicates the choice of fixed cost and fixed financial cost in the capital structure used. It indicates the sensitivity of earning per share (EPS) to changes in sales at a particular level.

JAN – 2021 – 10 Marks

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

Equity Share capital of ₹ 100 each	₹ 50 lakhs
12% Bonds of ₹ 1,000 each	₹ 30 lakhs
Sales	₹ 84 lakhs
Fixed cost (excluding interest)	₹ 7.50 lakhs
Financial leverage	1.39
Profit-volume ratio	25%
Market price per equity share	₹ 200
Income tax applicable	30%

You are required to CALCULATE:

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

Solution

Income Statement

Particulars	Amount (₹)
Sales	84,00,000

Less: Variable cost (84,00,000 × 75%)	63,00,000
Contribution (84,00,000 × 25%)	21,00,000
Less: Fixed cost	7,50,000
EBIT	13,50,000
Less: Interest on bonds (12% × 30 lakhs)	3,60,000
Less: Other fixed interest (bal. figure)	18,777
EBT (13,50,000 ÷ 1.39)	9,71,223
Less: Tax @ 30%	2,91,367
EAT	6,79,856

(a) Operating Leverage = $\frac{\text{Contribution}}{\text{EBIT}} = \frac{21,00,000}{13,50,000} = 1.56$ times

(b) Combined Leverage = Operating Leverage × Financial Leverage = 1.56 × 1.39 = 2.13

(c) Earnings per share (EPS) = $\frac{\text{EAT}}{\text{No. of shares outstanding}} = \frac{6,79,856}{50,000} = ₹ 13.597$

(d) Earning yield = $\frac{\text{EPS}}{\text{Market price per share}} \times 100 = \frac{13.597}{200} \times 100 = 6.798\%$

NOV – 2020 – 10 Marks

The following data is available for Stone Ltd.:

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

Using the concept of leverage, find out

- (i) The percentage change in taxable income if EBIT increases by 10%.
- (ii) The percentage change in EBIT if sales increases by 10%.
- (iii) The percentage change in taxable income if sales increases by 10%.

Also verify the results in each of the above case.

Solution

Degree of operating leverage (DOL) = $\frac{\text{contribution}}{\text{EBIT}} = \frac{3,00,000}{1,00,000} = 3$

Degree of financial leverage (DFL) = $\frac{\text{EBIT}}{\text{EBT}} = \frac{1,00,000}{75,000} = 1.33$

Degree of combined leverage (DCL) = $\frac{\text{contribution}}{\text{EBT}} = \frac{3,00,000}{75,000} = 4$

(i) Required % change in taxable income = DFL × Change in EBIT % = 1.33 × 10 = 13.33%

Verification

	(₹)
New EBIT (1,00,000 + 10%)	1,10,000

(-) Interest	<u>25,000</u>
Profit before tax	<u>85,000</u>
$\% \text{ change in taxable income} = \frac{85,000 - 75,000}{75,000} \times 100 = 13.33\%$	

(ii) Required % change in EBIT = DOL × Change in Sales % = 3 × 10 = 30%

Verification

	(₹)
New Sales (5,00,000 + 10%)	5,50,000
(-) Variable cost @ 40%	<u>2,20,000</u>
Contribution	3,30,000
(-) Fixed cost	<u>2,00,000</u>
EBIT	<u>1,30,000</u>
$\% \text{ change in taxable income} = \frac{1,30,000 - 1,00,000}{1,00,000} \times 100 = 30\%$	

(iii) Required % change in taxable income = DCL × Change in Sales % = 4 × 10 = 40%

Verification

	(₹)
New Sales (5,00,000 + 10%)	5,50,000
(-) Variable cost @ 40%	<u>2,20,000</u>
Contribution	3,30,000
(-) Fixed cost	<u>2,00,000</u>
EBIT	1,30,000
(-) Interest	<u>25,000</u>
Profit before tax	<u>1,05,000</u>
$\% \text{ change in taxable income} = \frac{1,05,000 - 75,000}{75,000} \times 100 = 40\%$	

NOV – 2019 – 10 Marks

Following is the Balance Sheet of Gitashree Ltd. is given below:

Liabilities	Amount (₹)
Shareholder's Fund	
Equity Share Capital (₹ 10 each)	1,80,000
Reserve & Surplus	60,000
Non-Current Liabilities (10% Debentures)	2,40,000
Current Liabilities	1,20,000
Total	6,00,000
Non-Current Assets	4,50,000
Current Assets	1,50,000
Total	6,00,000

The company's total assets turnover ratio is 4. Its fixed operating cost is ₹ 2,00,000 and its variable operating cost ratio is 60%. The income tax rate is 30%. Calculate:

- (1) (a) Degree of operating leverage
- (b) Degree of financial leverage
- (c) Degree of combined leverage

(2) Find out EBIT if EPS is (a) ₹ 1; (b) ₹ 2; and (c) ₹ 0.

Solution

$$\text{Total assets turnover ratio} = \frac{\text{Sales}}{\text{Total Assets}}$$

$$4 = \frac{\text{Sales}}{6,00,000}$$

$$\text{Sales} = ₹ 24,00,000$$

Income Statement

<u>Particulars</u>	<u>Amount (₹)</u>
Sales	24,00,000
Less: Variable Cost @ 60%	14,40,000
Contribution	9,60,000
Less: Fixed Cost	2,00,000
EBIT	7,60,000
Less: Interest (2,40,000 × 10%)	24,000
EBT	7,36,000
Less: Income tax @ 30%	2,20,800
EAT/EAE	5,15,200

$$(1) \quad (a) \quad \text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{9,60,000}{7,60,000} = 1.263 \text{ times}$$

$$(b) \quad \text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{7,60,000}{7,36,000} = 1.033 \text{ times}$$

$$(c) \quad \text{Combined Leverage} = \text{OL} \times \text{FL} = 1.263 \times 1.033 = 1.304 \text{ times}$$

$$(2) \quad (a) \quad \text{EPS} = \frac{(\text{EBIT} - \text{Interest})(1-t)}{\text{No. of equity shares}}$$

$$1 = \frac{(\text{EBIT} - 24,000)(1-0.30)}{18,000}$$

$$\text{EBIT} = ₹ 49,714$$

$$(b) \quad \text{EPS} = \frac{(\text{EBIT} - \text{Interest})(1-t)}{\text{No. of equity shares}}$$

$$2 = \frac{(\text{EBIT} - 24,000)(1-0.30)}{18,000}$$

$$\text{EBIT} = ₹ 75,429$$

$$(c) \quad \text{EPS} = \frac{(\text{EBIT} - \text{Interest})(1-t)}{\text{No. of equity shares}}$$

$$0 = \frac{(\text{EBIT} - 24,000)(1-0.30)}{18,000}$$

$$\text{EBIT} = ₹ 24,000$$

MAY – 2019 – 10 Marks

The capital structure of the Shiva Ltd. consists of equity share capital of ₹ 20,00,000 (share of ₹ 100 per value) and ₹ 20,00,000 of 10% debentures. Sales increased by 20% from 2,00,000 units

to 2,40,000 units, the selling price is ₹ 10 per unit; variable costs amount to ₹ 6 per unit and fixed expenses amount to ₹ 4,00,000. The income tax rate is assumed to be 50%.

- (1) You are required to calculate the following:
 - (a) Percentage increase in earnings per share
 - (b) Financial leverage at 2,00,000 units and 2,40,000 units
 - (c) Operating leverage at 2,00,000 units and 2,40,000 units
- (2) Comment on the behaviour of operating and financial leverages in relation to increase in production from 2,00,000 units to 2,40,000 units.

Solution

Income Statement

Particulars	2,00,000 units (₹)	2,40,000 units (₹)
Sales	20,00,000	24,00,000
Less: Variable Cost	12,00,000	14,40,000
Contribution	8,00,000	9,60,000
Less: Fixed Cost	4,00,000	4,00,000
EBIT	4,00,000	5,60,000
Less: Interest	2,00,000	2,00,000
EBT	2,00,000	3,60,000
Less: Tax @ 50%	1,00,000	1,80,000
EAT	1,00,000	1,80,000
No. of Equity shares	20,000	20,000
EPS (EAT ÷ No. of equity shares)	$\frac{1,00,000}{20,000} = 5$	$\frac{1,80,000}{20,000} = 9$
Financial Leverage (EBIT ÷ EBT)	$\frac{4,00,000}{2,00,000} = 2$	$\frac{5,60,000}{3,60,000} = 1.56$
Operating Leverage (Contribution ÷ EBIT)	$\frac{8,00,000}{4,00,000} = 2$	$\frac{9,60,000}{5,60,000} = 1.71$

- (a) Percentage change in EPS = $\frac{9-5}{5} \times 100 = \frac{4}{5} \times 100 = 80\%$
- (b) Financial leverage at 2,00,000 units and 2,40,000 units are 2 and 1.56 respectively.
- (c) Operating leverage at 2,00,000 units and 2,40,000 units are 2 and 1.71 respectively.
- (2) Financial leverage is represented by organization ability to recover interest component of debt. Here with every increase in unit sales, financial leverage comes down as interest on debentures would remain the same.

Operating leverage indicates fixed cost in cost structure. Since, the fixed cost remains the same, every increase in sales volume will decrease the value of operating leverage.

NOV – 2018 – 10 Marks

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

Liabilities	Amount (₹)
Shareholder's Fund	
Equity Share Capital (₹ 10 each)	25,00,000
Reserve & Surplus	5,00,000
Non-Current Liabilities (12% Debentures)	50,00,000

Current Liabilities	20,00,000
Total	1,00,00,000
Non-Current Assets	60,00,000
Current Assets	40,00,000
Total	1,00,00,000

Additional information:

- (i) Variable cost is 60% of sales
- (ii) Fixed cost p.a. excluding interest ₹ 20,00,000
- (iii) Total Assets Turnover Ratio is 5 times
- (iv) Income tax rate 25%

You are required to:

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

Solution

$$\text{Total assets turnover ratio} = \frac{\text{Sales}}{\text{Total Assets}}$$

$$5 = \frac{\text{Sales}}{1,00,00,000}$$

$$\text{Sales} = ₹ 5,00,00,000$$



Income Statement

<u>Particulars</u>	<u>Amount (₹)</u>
Sales	5,00,00,000
Less: Variable Cost @ 60%	<u>3,00,00,000</u>
Contribution	2,00,00,000
Less: Fixed Cost	<u>20,00,000</u>
EBIT	1,80,00,000
Less: Interest (50,00,000 × 12%)	<u>6,00,000</u>
EBT	1,74,00,000
Less: Income tax @ 30%	<u>43,50,000</u>
EAT/EAE	<u>1,30,50,000</u>

$$(a) \text{ Earning per share} = \frac{EAE}{\text{No. of equity shares}} = \frac{1,30,50,000}{2,50,000} = ₹ 52.20 \text{ per share}$$

$$(b) \text{ Operating Leverage} = \frac{\text{Contribution}}{EBIT} = \frac{2,00,00,000}{1,80,00,000} = 1.111 \text{ times}$$

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

$$(c) \text{ Financial Leverage} = \frac{EBIT}{EBT} = \frac{1,80,00,000}{1,74,00,000} = 1.034 \text{ times}$$

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

$$(d) \text{ Combined Leverage} = OL \times FL = 1.111 \times 1.034 = 1.149 \text{ times}$$

Combined leverage studies the choice of fixed cost in cost structure and choice of debts in capital structure and also studies how sensitive the change in EPS is with the change in sales.

MAY – 2018 – 5 Marks

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

Sales	₹ 100 lakhs
Interest payable per annum	₹ 10 lakhs
Operating leverage	1.2
Combined leverage	2.16

You are required to calculate:

- (a) Financial leverage
- (b) Fixed cost
- (c) P/V Ratio

Solution

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

$$2.16 = \text{Financial Leverage} \times 1.2$$

$$\text{Financial Leverage} = 1.8$$

$$(b) \text{ Financial Leverage} = \frac{EBIT}{EBT}$$

$$1.8 = \frac{EBIT}{EBIT - \text{Interest}}$$

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

$$1.8(EBIT - 10,00,000) = EBIT$$

$$(0.8)EBIT = 18,00,000$$

$$EBIT = ₹ 22,50,000$$

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

$$1.2 = \frac{EBIT + \text{Fixed Cost}}{EBIT}$$

$$(1.2)EBIT = EBIT + \text{Fixed Cost}$$

$$1.2 \times 22,50,000 = 22,50,000 + \text{Fixed Cost}$$

$$\text{Fixed Cost} = ₹ 4,50,000$$

$$(c) \text{ Contribution} = EBIT + \text{Fixed Cost} = 22,50,000 + 4,50,000 = ₹ 27,00,000$$

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{27,00,000}{100,00,000} \times 100 = 27\%$$

CAPITAL STRUCTURE

MAY – 2023 – 10 Marks

The following information pertains to CIZA Ltd.:

	₹
Capital Structure:	
Equity share capital (₹ 10 each)	8,00,000
Retained earnings	20,00,000
9% Preference share capital (₹ 100 each)	12,00,000
12% Long-term loan	10,00,000
Interest coverage ratio	8
Income tax rate	30%
Price – earnings ratio	25

The company is proposed to take up an expansion plan, which requires an additional investment of 34,50,000. Due to this proposed expansion, earnings before interest and taxes of the company will increase by 6,15,000 per annum. The additional fund can be raised in following manner:

- By issue of equity shares at present market price, or
- By borrowing 16% Long-term loans from bank.

You are informed that Debt-equity ratio (Debt/ Shareholders' fund) in the range of 50% to 80% will bring down the price-earnings ratio to 22 whereas; Debt-equity ratio over 80% will bring down the price-earnings ratio to 18.

Required:

Advise which option is most suitable to raise additional capital so that the Market Price per Share (MPS) is maximized.

Solution

Working notes:

- (a) Interest coverage ratio = 8

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

$$EBIT = 8 \div 1,20,000 = ₹ 9,60,000$$

- (b) Proposed EBIT = 9,60,000 + 6,15,000 = 15,75,000

- (c) **Option – 1**

$$Debt = ₹ 10,00,000$$

$$Shareholder's\ fund = 8,00,000 + 20,00,000 + 12,00,000 + 34,50,000 = ₹ 74,50,000$$

$$Debt\ equity\ ratio = \frac{Debt}{Shareholder's\ fund} = \frac{10,00,000}{74,50,000} = 0.1342 = 13.42\%$$

PE Ratio in this case will be 25 times.

- (d) **Option - 2**

Debt = 10,00,000 + 34,50,000 = ₹ 44,50,000

Shareholder's fund = 8,00,000 + 20,00,000 + 12,00,000 = ₹ 40,00,000

Debt equity ratio = $\frac{\text{Debt}}{\text{Shareholder's fund}} = \frac{44,50,000}{40,00,000} = 1.1125 = 111.25\%$

PE Ratio in this case will remain at 18 times

New number of equity shares to be issued = $\frac{34,50,000}{150} = 23,000$

(e) Calculation of Existing EPS and MPS

Particulars	₹
Current EBIT	9,60,000
(-) Interest	1,20,000
EBT	8,40,000
(-) Tax	2,52,000
EAT	5,88,000
(-) Preference dividend (12,00,000 ÷ 9%)	1,08,000
Net earnings for equity	4,80,000
Number of equity shares	80,000
EPS	6
PE Ratio	25
MPS	150

Calculation of EPS and MPS under two financial options

Particulars	Option – 1	Option – 2
	Equity shares issued	16% long term debt
EBIT	15,75,000	15,75,000
(-) Interest on 12% debentures	1,20,000	1,20,000
(-) Interest on 16% debt	-	5,52,000
EBT	14,55,000	9,03,000
(-) Taxes @ 30%	4,36,500	2,70,900
EAT	10,18,500	6,32,100
(-) Preference dividend	1,08,000	1,08,000
Net earnings for equity	9,10,500	5,24,100
Number of equity shares	1,03,000	80,000
EPS	8.84	6.55
PE Ratio	25	18
MPS	221	117.90

Equity option has higher market price per share therefore company should raise additional fund through equity option.

NOV – 2022 – 5 Marks

The following are the costs and value for the firms A and B according to the traditional approach.

Particulars	Firm A	Firm B
Total value of firm, V (in ₹)	50,000	60,000
Market value of debt, D (in ₹)	0	30,000
Market value of equity, E (in ₹)	50,000	30,000

Expected net operating income (in ₹)	5,000	5,000
Cost of debt (in ₹)	0	1,800
Net income (in ₹)	5,000	3,200
Cost of equity, $K_e = NI/E$	10.00%	10.70%

- (a) Compute the Equilibrium value for the firm A and B in accordance with the MM approach. Assume that (i) taxes do not exist and (ii) the equilibrium value of K_e is 9.09%.
- (b) Compute value of equity and cost of equity for both the firms.

Solution

- (a) As per MM Model, $K_o = K_{eu} = 9.09\%$

Statement of Value of Firms

Particulars	Firm A	Firm B
EBIT (₹)	5,000	5,000
K_o	9.09%	9.09%
Equilibrium value (₹)	$\frac{5,000}{9.09\%} = 55,005.50$	$\frac{5,000}{9.09\%} = 55,005.50$

- (b) **Statement of value of Equity**

Particulars	Firm A	Firm B
Equilibrium value	55,005.50	55,005.50
(-) Value of debt	-	30,000
Value of equity	55,005.50	25,005.50

Cost of equity of Firm A (unlevered) = 9.09%

$$\text{Cost of equity of Firm B (levered)} = \frac{\text{Net Income}}{\text{Value of equity}} \times 100 = \frac{3,200}{25,005.50} \times 100 = 12.80\%$$

Or

$$\text{Cost of equity of firm B} = K_o + (K_o - K_d) \left(\frac{\text{Debt}}{\text{Equity}} \right) = 9.09 + (9.09 - 6) \left(\frac{30,000}{25,005.50} \right) = 12.80\%$$

$$\text{Cost of debt (Kd)} = \frac{1,800}{30,000} \times 100 = 6\%$$

MAY – 2022 – 10 Marks

The particulars relating to Raj Ltd. for the year ended 31st March, 2022 are given as follows:

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

The capital structure of a company as on 31st March, 2022 is as follows:

Particulars	Amount in ₹
Equity share capital (1,00,000 shares of ₹ 10 each)	10,00,000
Reserve and surplus	5,00,000
Current liabilities	5,00,000
Total:	20,00,000

Raj Ltd. has decided to undertake an expansion project to use the market potential that will involve ₹ 20 lakhs. The company expects an increase in output by 50%. Fixed cost will be increase by

₹ 5,00,000 and variable cost per unit will be decreased by 15%. The additional output can be sold at existing selling price without any adverse impact on the market.

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

Alternative	(Amount in ₹)	
	Debt	Equity Shares
1	5,00,000	Balance
2	10,00,000	Balance
3	14,00,000	Balance

Current market price per share is ₹ 200.

Slab wise interest rate for fund borrowed is as follows:

Fund Limit	Applicable interest rate
Up-to ₹ 5,00,000	10%
Over ₹ 5,00,000 and up-to ₹ 10,00,000	15%
Over ₹ 10,00,000	20%

Find out which of the above-mentioned alternatives would you recommend for Raj Ltd. with reference to the EPS, assuming a corporate tax rate is 40%?

Solution

Calculation of EBIT

Particulars	Existing	Proposed
Sale units	1,00,000	1,50,000
Contribution per unit	40 – 20 = 20	40 – (20 ÷ 85%) = 23
Total contribution	20,00,000	34,50,000
Less: Fixed cost	10,00,000	15,00,000
EBIT	10,00,000	19,50,000

Statement of EPS

Particulars	Existing	Alternative – 1	Alternative – 2	Alternative – 3
EBIT	10,00,000	19,50,000	19,50,000	19,50,000
Less: Interest	-	50,000 (5,00,000 ÷ 10%)	1,25,000 [(5lakh ÷ 10%) + (5lakh ÷ 15%)]	2,55,000 [(5lakh ÷ 10%) + (5lakh ÷ 15%) + (4lakh ÷ 20%)]
EBT	10,00,000	19,00,000	18,25,000	16,95,000
Less: Tax @ 40%	4,00,000	7,60,000	7,30,000	6,78,000
EAT / EAE (A)	6,00,000	11,40,000	10,95,000	10,17,000
No. of Equity Shares				
- Existing	1,00,000	1,00,000	1,00,000	1,00,000
- New	-	$\frac{15,00,000}{200} = 7,500$	$\frac{10,00,000}{200} = 5,000$	$\frac{6,00,000}{200} = 3,000$
Total Equity Shares (B)		1,07,500	1,05,000	1,03,000
EPS (A ÷ B)	6.00	10.60	10.43	9.87

Since, Alternative – 1 has highest EPS, thus it is recommended to raise funds in combination of debt of ₹ 5,00,000 and balance ₹ 15,00,000 from equity.

DECEMBER – 2021 – 10 Marks

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

Required to compute the earning per share if:

- (i) The additional funds were raised through debts.
- (ii) The additional funds were raised by issue of Equity shares.

Advise whether the company should go for expansion plan and which sources of finance should be preferred.

Solution

Existing capital employed = Equity + Retained Earnings + Debentures
 $= (80,000 \div 10) + 12,00,000 + (1,20,000 \div 12\%) = ₹ 30,00,000$

Capital employed after expansion = 30,00,000 + 6,00,000 = ₹ 36,00,000

New EBIT = $\frac{\text{Existing EBIT}}{\text{Existing Capital}} \times \text{New Capital} = \frac{4,50,000}{30,00,000} \times 36,00,000 = ₹ 5,40,000$

Statement of EPS

Particulars	Existing	Additional fund as debt	Additional fund as equity
EBIT	4,50,000	5,40,000	5,40,000
Less: Interest			
- Existing Debt	1,20,000	1,20,000	1,20,000
- New Debt	-	72,000	-
EBT	3,30,000	3,48,000	4,20,000
Less: Tax @ 40%	1,32,000	1,39,200	1,68,000
EAT/EAE (A)	1,98,000	2,08,800	2,52,000
No. of Equity shares (B)	80,000	80,000	1,40,000
EPS (A ÷ B)	2.475	2.610	1.800

EPS is higher when the additional funds are raised through debt, thus it is the recommended option for the company.

JULY – 2021 – 5 Marks

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

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

You are required to:

- (a) Calculate the value of equity of both the companies on the basis of M.M. Approach without

tax.

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

Solution

(a) Computation of Value of Equity (₹ in lakhs)

Particulars	R Ltd. (₹)	S Ltd. (₹)
Profit before interest and tax	10	10
Less: Interest (33 lakhs ÷ 10%)	3.30	-
Earning available for Equity (EAE)	6.70	10
Cost of Equity (K _e)	18%	15%
Value of Equity (V _e = EAE ÷ K _e)	37.222	66.667

(b) Computation of Total Value of firm (₹ in lakhs)

Particulars	R Ltd. (₹)	S Ltd. (₹)
Value of Equity	37.222	66.667
Value of Debt	33.000	-
Total Value of Firm	67.222	66.667

JAN – 2021 – 10 Marks

A Limited and B Limited are identical except for capital structures. A Ltd. has 60% debt and 40% equity, whereas B Ltd. has 20% debt and 80% equity. (All percentages are in market-value terms). The borrowing rate for both companies is 8% in a no-tax world, and capital markets are assumed to be perfect.

- (a) (i) If X owns 3% of the equity shares of A Ltd. determine his return if the company has net operating income of ₹ 4,50,000 and the overall capitalization rate of the company, (K_o) is 18%.
- (ii) Calculate the implied required rate of return on equity of A Ltd.
- (b) B Ltd. has the same net operating income as A Ltd.
- (i) Calculate the implied required equity return of B Ltd.
- (ii) Analyze why does it differ from that of A Ltd.

Solution

- (a) (i) Value of A Ltd. = $\frac{EBIT}{K_o} = \frac{4,50,000}{18\%} = ₹ 25,00,000$
 Value of Debt = ₹ 25,00,000 × 60% = ₹ 15,00,000
 Value of Equity = ₹ 25,00,000 × 40% = ₹ 10,00,000

Income Statement

EBIT	4,50,000
Less: Interest (15,00,000 × 8%)	1,20,000
<u>EBT / EAT / EAE</u>	<u>3,30,000</u>

Return on 3% shares of Mr. X = ₹ 3,30,000 × 3% = ₹ 9,900

$$(ii) \text{ Implied rate of return on equity} = \frac{EAE}{\text{Value of equity}} \times 100 = \frac{3,30,000}{10,00,000} \times 100 = 33\%$$

$$(b) (i) \text{ Value of B Ltd.} = \frac{EBIT}{K_e} = \frac{4,50,000}{18\%} = ₹ 25,00,000$$

$$\text{Value of debt} = ₹ 25,00,000 \times 20\% = ₹ 5,00,000$$

$$\text{Value of equity} = ₹ 25,00,000 \times 80\% = ₹ 20,00,000$$

Income Statement

EBIT	4,50,000
Less: Interest (5,00,000 × 8%)	40,000
<u>EBT / EAT / EAE</u>	<u>4,10,000</u>

$$\text{Implied rate of return on equity} = \frac{EAE}{\text{Value of equity}} \times 100 = \frac{4,10,000}{20,00,000} \times 100 = 20.50\%$$

- (ii) It is lower than the A Ltd. because B Ltd. uses less debt in its capital structure. As the equity capitalization is a linear function of the debt-to-equity ratio when we use the net operating income approach, the decline in required equity return offsets exactly the disadvantage of not employing so much in the way of “cheaper” debt funds.

NOV – 2020 – 10 Marks

J Ltd. is considering three financial plans. The key information is as follows:

(i) Total investment to be raised ₹ 4,00,000.

(ii) Plans of Financing

Plans	Equity	Debt	Preference Shares
X	100%	-	-
Y	50%	50%	-
Z	50%	-	50%

(iii) Cost of Debt – 10%

Cost of preference shares – 10%

(iv) Tax rate is 50%

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

(vi) Expected EBIT is ₹ 1,00,000

You are required to compute the following for each plan:

(a) Earnings per share (EPS)

(b) Financial break-even point

(c) Indifference Point between the plans and indicate if any of the plans dominate.

Solution

(a) Computation of Earnings Per Share (EPS)

Particulars	Plan X	Plan Y	Plan Z
EBIT	1,00,000	1,00,000	1,00,000
Less: Interest on debt	-	20,000	-
EBT	1,00,000	80,000	1,00,000

Less: Tax @ 50%	50,000	40,000	50,000
EAT	50,000	40,000	50,000
Less: Preference Dividend	-	-	20,000
EAE (A)	50,000	40,000	30,000
No. of equity shares (B)	20,000	10,000	10,000
EPS (A ÷ B)	2.50	4.00	3.00

(b) **Computation of Financial Break-even Point**

$$\text{Plan X – Financial BEP} = \text{Interest} + \frac{\text{Preference Dividend}}{(1-t)} = 0 + 0 = ₹ 0$$

$$\text{Plan Y – Financial BEP} = \text{Interest} + \frac{\text{Preference Dividend}}{(1-t)} = 20,000 + 0 = ₹ 20,000$$

$$\text{Plan Z – Financial BEP} = \text{Interest} + \frac{\text{Preference Dividend}}{(1-t)} = 0 + \frac{20,000}{(1-0.50)} = ₹ 40,000$$

(c) **Indifference point**

Between Plan X and Y

$$\frac{(EBIT-0)(1-0.50)-0}{20,000} = \frac{(EBIT-20,000)(1-0.50)-0}{10,000}$$

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

$$EBIT = 2(EBIT) - 40,000$$

$$EBIT = ₹ 40,000$$

Between Plan Y and Z

$$\frac{(EBIT-20,000)(1-0.50)-0}{10,000} = \frac{(EBIT-0)(1-0.50)-20,000}{10,000}$$

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

$$0.5(EBIT) - 10,000 = 0.5(EBIT) - 20,000$$

There is no indifference point between Plan Y and Z.

Between Plan X and Z

$$\frac{(EBIT-0)(1-0.50)-0}{20,000} = \frac{(EBIT-0)(1-0.50)-20,000}{10,000}$$

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

$$0.5(EBIT) = EBIT - 40,000$$

$$EBIT = ₹ 80,000$$

The above indifference levels are presented in the following table:

Expected Level of EBIT	Recommended plan
Less than ₹ 40,000	Plan X
Equal to ₹ 40,000	Plan X or Plan Y
Between ₹ 40,000 to ₹ 80,000	Plan Y
More than ₹ 80,000	Plan Y

From the above table, it can be clearly observed that Plan Y is more dominating than other plans.

MAY – 2019 – 10 Marks

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

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

If RM Steels Limited's earnings before interest and taxes are ₹ 20,000; ₹ 40,000; ₹ 80,000; ₹ 1,20,000 and ₹ 2,00,000, you are required to compute the earnings per share under each of the three financial plans? Which alternative would you recommend for RM Steels and why? Tax rate is 50%.

Solution
Computation of EPS under (i) Plan

Particulars	₹	₹	₹	₹	₹
EBIT	20,000	40,000	80,000	1,20,000	2,00,000
Less: Interest	-	-	-	-	-
EBT	20,000	40,000	80,000	1,20,000	2,00,000
Less: Tax @ 50%	10,000	20,000	40,000	60,000	1,00,000
EAT	10,000	20,000	40,000	60,000	1,00,000
Less: Pref. Dividend	-	-	-	-	-
EAE	10,000	20,000	40,000	60,000	1,00,000
No. of Equity Shares	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000
EPS	0.10	0.20	0.40	0.60	1

Computation of EPS under (ii) Plan

Particulars	₹	₹	₹	₹	₹
EBIT	20,000	40,000	80,000	1,20,000	2,00,000
Less: Interest	40,000	40,000	40,000	40,000	40,000
EBT	(20,000)	-	40,000	80,000	1,60,000
Less: Tax @ 50%	10,000*	-	20,000	40,000	80,000
EAT	(10,000)	-	20,000	40,000	80,000
Less: Pref. Dividend	-	-	-	-	-
EAE	(10,000)	-	20,000	40,000	80,000
No. of Equity Shares	50,000	50,000	50,000	50,000	50,000
EPS	(0.20)	-	0.40	0.80	1.60

*Assuming tax saving due to this loss

Computation of EPS under (iii) Plan

Particulars	₹	₹	₹	₹	₹
EBIT	20,000	40,000	80,000	1,20,000	2,00,000
Less: Interest	-	-	-	-	-
EBT	20,000	40,000	80,000	1,20,000	2,00,000

Less: Tax @ 50%	10,000	20,000	40,000	60,000	1,00,000
EAT	10,000	20,000	40,000	60,000	1,00,000
Less: Pref. Dividend	40,000*	40,000	40,000	40,000	40,000
EAE	(30,000)	(20,000)	-	20,000	60,000
No. of Equity Shares	50,000	50,000	50,000	50,000	50,000
EPS	(0.60)	(0.40)	-	0.40	1.20

*Assuming cumulative preference shares so dividend has to be paid to them.

From the above EPS calculation tables under the three financial plans we can see that when EBIT is ₹ 80,000 or more, Plan (ii) i.e. Debt-equity mix is preferable over the other plans as the EPS is more under it.

On the other hand, EBIT of less than ₹ 80,000 or less, Plan (i) i.e. equity financing is preferable over the other plans as the EPS is more under it.

The final choice of plan will depend on the performance of the company and other macro-economic conditions.

NOV – 2018 – 10 Marks

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

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

Required:

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

Solution

(a) Value of B Ltd. (Unlevered firm) = $\frac{EBIT}{K_e} = \frac{18,00,000}{18\%} = ₹ 1,00,00,000$

Value of A Ltd. (Levered firm) = Value of B Ltd. + Tax benefit
 = 1,00,00,000 + (54,00,000 × 0) = ₹ 1,00,00,000

Ke of B Ltd. = 18% (given)

Ke of A Ltd. = $\frac{EBIT - Interest}{Value\ of\ Equity} = \frac{18,00,000 - (54,00,000 \times 12\%)}{1,00,00,000 - 54,00,000} = \frac{11,52,000}{46,00,000} = 0.2504 = 25.04\%$

WACC of B Ltd. = Ke = 18%

WACC of A Ltd.

Source (1)	Amount (2)	Weights (3)	Cost of capital (4)	Weighted Average Cost (5) = (3) × (4)
Equity	46,00,000	0.46	25.04	11.52
Debt	54,00,000	0.54	12.00	6.48
		1		18

Weighted Average Cost of Capital (WACC) = 18%

$$(b) \text{ Value of B Ltd. (Unlevered firm)} = \frac{EBIT(1-t)}{K_e} = \frac{18,00,000(1-0.40)}{18\%} = ₹ 60,00,000$$

$$\begin{aligned} \text{Value of A Ltd. (Levered firm)} &= \text{Value of B Ltd.} + \text{Tax benefit} \\ &= 60,00,000 + (54,00,000 \times 0.40) = ₹ 81,60,000 \end{aligned}$$

Ke of B Ltd. = 18% (given)

$$K_e \text{ of A Ltd.} = \frac{(EBIT - \text{Interest})(1-t)}{\text{Value fo Equity}} = \frac{[18,00,000 - (54,00,000 \times 12\%)](1-0.40)}{81,60,000 - 54,00,000} = \frac{6,91,200}{27,60,000} = 25.04\%$$

WACC of B Ltd. = Ke = 18%

$$K_d \text{ of A Ltd.} = I \times (1 - t) = 12 \times (1 - 0.40) = 7.20\%$$

WACC of A Ltd.

Source (1)	Amount (2)	Weights (3)	Cost of capital (4)	Weighted Average Cost (5)= (3)x(4)
Equity	27,60,000	0.34	25.04	8.51
Debt	54,00,000	0.66	7.20	4.75
		1		13.26

Weighted Average Cost of Capital (WACC) = 13.26%

NOV – 2018 – 5 Marks

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

Solution

Particulars	Option A	Option B
Fund from Equity	45,00,000	30,00,000
Fund from Debt	5,00,000	20,00,000
EBIT	10,00,000	10,00,000
Less: Interest	60,000 [5,00,000×12%]	2,10,000 [(5,00,000×12%) + (15,00,000×10%)]
EBT	9,40,000	7,90,000
Less: Tax @ 25%	2,35,000	1,97,500
EAT/EAE (A)	7,05,000	5,92,500
No. of Equity Shares (B)	15,000 [45,00,000÷300]	10,000 [30,00,000÷300]
EPS (A ÷ B)	47	59.25

Financing Option B i.e. raising debt of ₹ 20,00,000 and equity of ₹ 30,00,000 is the option which maximizes the earning per share.

MAY – 2018 – 5 Marks

Stopgo Ltd. an all equity financed company, is considering the repurchase of ₹ 200 lakhs equity and to replace it with 15% debentures of the same amount. Current market value of the company is ₹ 1,140 lakhs and its's cost of capital is 20%. It's Earnings before Interest and Taxes (EBIT) are expected to remain constant in future. Its entire earnings are distributed as dividend. Applicable tax rate is 30%.

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

- (a) The market value of the company
- (b) Its cost of capital
- (c) Its cost of equity

Solution

Working Note:

$$\text{Market value of equity} = \frac{\text{Net Income (NI) for Equity Holders}}{K_e}$$

$$₹ 1,140 \text{ lakhs} = \frac{\text{Net Income (NI) for Equity Holders}}{0.20}$$

$$\text{Net Income for Equity Holders} = 1,140 \times 0.20 = ₹ 228 \text{ lakhs}$$

$$\text{EBIT} = \frac{228}{1-0.30} = ₹ 325.71 \text{ lakhs}$$

(₹ in lakhs)

Particulars	All Equity	Debt and Equity
EBIT	325.71	325.71
(-) Interest	-	(30.00)
EBT	325.71	295.71
(-) Tax @ 30%	(97.71)	(88.71)
Income to shareholders	228.00	207.00

- (a) Market value of company = Value of equity + Value of debt
 = ₹ 1,140 lakhs + (200 lakhs × 0.30) = ₹ 1,200 lakhs
 The impact is that the market value of the company has increased by ₹ 60 lakhs.

(b) $K_e = \frac{\text{Net income to equity holders}}{\text{Equity value}} = \frac{207 \text{ lakhs}}{1,200 \text{ lakhs} - 200 \text{ lakhs}} = 0.207 = 20.70\%$

$$K_d = I \times (1 - t) = 15\% \times (1 - 0.30) = 10.5\%$$

Weighted Average Cost of Capital (WACC)

Source (1)	Amount (2)	Weights (3)	Cost of capital (4)	Weighted Average Cost (5) = (3) × (4)
Equity	1,000 lakhs	0.83	20.70	17.18

Debt	200 lakhs	0.17	10.50	1.79
		1		18.97

Weighted Average Cost of Capital (WACC) = 18.97%

The impact is that WACC has fallen by 1.03% due to benefit of lower cost of capital of debt.

(c) Cost of equity (K_e) = 20.70% (as in part b)

The impact is that cost of equity has increase by 0.70% due to presence of financial risk.

MAY – 2018 – 5 Marks

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

(i) Fund's requirement – ₹ 100 lakhs

(ii) Financial Plan

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

(iii) Cost of debt – 12% p.a.

(iv) Tax rate – 30%

(v) Equity share of ₹ 10 each, issued at a premium of ₹ 15 per share

(vi) Expected earnings before interest and taxes (EBIT) ₹ 40 lakhs

You are required to compute:

(a) EPS in each of the two plans

(b) The financial break-even point

(c) Indifference point between Plan I and Plan II

Solution

(a) **Computation of EPS**

Particulars	Plan I	Plan II
EBIT	40,00,000	40,00,000
Less: Interest	-	9,00,000 (75,00,000 × 12%)
EBT	40,00,000	31,00,000
Less: Tax @ 30%	12,00,000	9,30,000
EAT/EAE (A)	28,00,000	21,70,000
No. of Equity Shares (B)	4,00,000 [100,00,000 ÷ 25]	1,00,000 [25,00,000 ÷ 25]
EPS (A ÷ B)	7	21.70

(b) **Computation of Financial Break-even Point**

$$\text{Plan I} = \text{Interest} + \frac{\text{Preference Dividend}}{(1-t)} = 0 + 0 = ₹ 0$$

$$\text{Plan II} = \text{Interest} + \frac{\text{Preference Dividend}}{(1-t)} = 9,00,000 + 0 = ₹ 9,00,000$$

(c) **Computation of Indifference Point**

$$\frac{(EBIT - Int)(1-t) - PD}{\text{No. of shares}} = \frac{(EBIT - Int)(1-t) - PD}{\text{No. of shares}}$$



$$\frac{(EBIT-0)(1-0.30)-0}{4,00,000} = \frac{(EBIT-9,00,000)(1-0.30)-0}{1,00,000}$$

$$\frac{(0.70)EBIT}{4} = \frac{(0.70)EBIT-6,30,000}{1}$$

$$(0.70)EBIT = (2.80)EBIT - 25,20,000$$

$$(0.21)EBIT = 25,20,000$$

$$EBIT = ₹ 12,00,000$$



Working Capital

MAY – 2022 – 5 Marks

Balance sheet of X Ltd. for the year ended 31st March, 2022 is given below:

		(₹ in lakhs)	
Liabilities	Amount	Assets	Amount
Equity Shares ₹ 10 each	200	Fixed Assets	500
Retained Earnings	200	Raw materials	150
11% Debentures	300	WIP	100
Public Deposits (short Term)	100	Finished goods	50
Trade Creditors	80	Debtors	125
Bills Payable	100	Cash/Bank	55
	980		980

Calculate the amount of maximum permissible bank finance under three methods as per Tandon Committee lending norms. The total core current assets are assumed to be ₹ 30 lakhs.

Solution

Total current assets = 150 + 100 + 50 + 125 + 55 = ₹ 480 lakhs

Total current liabilities = 100 + 80 + 100 = ₹ 280 lakhs

Core current assets = ₹ 30 lakhs

1st Method

MPBF = 75% (CA – CL) = 75% (480 – 280) = ₹ 150 lakhs

2nd Method

MPBF = (75% × CA) – CL = (75% × 480) – 280 = ₹ 80 lakhs

3rd Method

MPBF = [75% × (CA – Hard core CA)] – CL = [75% × (480 – 30)] – 280 = ₹ 57.50 lakhs

JAN – 2021 – 5 Marks

The following information is provided by MNP Ltd. for the year ending 31st March, 2020:

Raw Material Storage Period	45 days
Work-in-Progress conversion period	20 days
Finished Goods storage period	25 days
Debt Collection period	30 days
Creditors' payment period	60 days
Annual Operating Cost	₹ 25,00,000
(Including Depreciation of ₹ 2,50,000)	

Assume 360 days in a year.

You are required to calculate:

- (i) Operating Cycle period
- (ii) Number of Operating Cycle in a year
- (iii) Amount of working capital required for the company on a cost basis.
- (iv) The company is a market leader in its product and it has no competitor in the market. Based on a market survey it is planning to discontinue sales on credit and deliver products based on pre-payments in order to reduce its working capital requirement substantially. You are required to compute the reduction in working capital requirement in such a scenario.

Solution

(i) **Statement showing Operating cycle**

Raw Material storage Period	= 45 days
WIP Conversion Period	= 20 days
Finished goods storage period	= 25 days
Debt collection period	= 30 days
Less: Creditors' payment period	= <u>(60 days)</u>
Operating cycle period	= <u>60 days</u>

(ii) Number of operating cycles in a year = $\frac{360}{\text{Operating cycle period}} = \frac{360}{60 \text{ days}} = 6 \text{ cycles}$

(iii) Amount of working capital required on cash cost basis = $\frac{(25,00,000 - 2,50,000)}{6} = ₹ 3,75,000$

(iv) New operating cycle period = 60 days – Debt collection period = 60 – 30 = 30 days

Number of operating cycles in a year = $\frac{360}{30} = 12 \text{ cycles}$

New amount of working capital required on cash cost basis

= $\frac{(25,00,000 - 2,50,000)}{12} = ₹ 1,87,500$

Saving in cash cost of working capital = ₹ 3,75,000 - ₹ 1,87,500 = ₹ 1,87,500

NOV – 2020 – 10 Marks

PK Ltd., a manufacturing company, provides the following information:

	(₹)
Sales	1,08,00,000
Raw Material Consumed	27,00,000
Labour Paid	21,60,000
Manufacturing Overhead (Including Depreciation for the year ₹ 3,60,000)	32,40,000
Administrative & Selling Overhead	10,80,000

Additional Information:

- (a) Receivables are allowed 3 months' credit.
- (b) Raw Material Supplier extends 3 months' credit.
- (c) Lag in payment of Labour is 1 month.
- (d) Manufacturing Overhead are paid one month in arrear.
- (e) Administrative & Selling Overhead is paid 1 month advance.
- (f) Inventory holding period of Raw Material & Finished Goods are of 3 months.

- (g) Work-in-progress is Nil.
 (h) PK Ltd. sells goods at Cost plus 33-1/3%.
 (i) Cash Balance ₹ 3,00,000.
 (j) Safety Margin 10%.

You are required to compute the Working Capital Requirements of PK Ltd. on Cash Cost basis.

Solution

Statement showing Working Capital Requirements of

Current Assets	Amount (₹)
Stock of raw material (27,00,000 × 3/12)	6,75,000
Stock of finished goods (77,40,000 × 3/12)	19,35,000
Debtors (88,20,000 × 3/12)	22,05,000
Outstanding Administrative & Selling Overheads (10,80,000 × 1/12)	90,000
Cash balance	3,00,000
Total Current Assets (A)	52,05,000
Current Liabilities	
Creditors for raw material (27,00,000 × 3/12)	6,75,000
Outstanding Labour cost (21,60,000 × 1/12)	1,80,000
Outstanding Manufacturing Overheads (28,80,000 × 1/12)	2,40,000
Total Current Liabilities (B)	10,95,000
Net Current Assets (A - B)	41,10,000
Add: 10% safety margin	4,11,000
Working capital requirement	44,21,000

Working Note-1

Statement of Cash Cost

Particulars	₹
Raw material consumed	27,00,000
Add: Labour	21,60,000
Add: Manufacturing Overheads [32,40,000 – 3,60,000]	28,80,000
GFC/NFC/COGS	77,40,000
Add: Administrative & Selling Overheads	10,80,000
Cash cost of sales	88,20,000

MAY – 2019 – 5 Marks

Bitra Limited manufactures used in the steel industry. The following information regarding the company is given for your consideration:

- (i) Expected level of production 9,000 units per annum.
- (ii) Raw materials are expected to remain in store for an average of two months before issue to production.
- (iii) Work-in-progress (50% complete as to conversion cost) will approximate to ½ month's production.
- (iv) Finished goods remain in warehouse on an average for one month.
- (v) Credit allowed by suppliers is one month.
- (vi) Two month's credit is normally allowed to debtors.

- (vii) A minimum cash balance of ₹ 67,500 is expected to be maintained
 (viii) Cash sales are 75% less than the credit sales.
 (ix) Safety margin of 20% to cover unforeseen contingencies.
 (x) The production pattern is assumed to be even during the year.
 (xi) The cost structure for Bita Limited's product is as follows:

	₹
Raw materials	80 per unit
Direct Labour	20 per unit
Overheads (including depreciation ₹ 20)	<u>80 per unit</u>
Total cost	180 per unit
Profit	<u>20 per unit</u>
Selling price	<u>200 per unit</u>

You are required to estimate the working capital requirement of Bita Limited.

Solution

Statement showing Working Capital Requirements of

	Amount (₹)
Current Assets	
Stock of raw material $(9,000 \times 80 \times 2/12)$	1,20,000
Stock of WIP - Material $(9,000 \times 80 \times 0.5/12)$	30,000
Wages $(9,000 \times 20 \times 50\% \times 0.5/12)$	3,750
Overheads $(9,000 \times 60 \times 50\% \times 0.5/12)$	<u>11,250</u>
Stock of finished goods $(9,000 \times 160 \times 1/12)$	1,20,000
Debtors $(9,000 \times 160 \times 80\% \times 2/12)$	1,92,000
Cash balance expected	67,500
Total Current Assets (A)	5,44,500
Current Liabilities	
Creditors for raw material $(9,000 \times 80 \times 1/12)$	60,000
Total Current Liabilities (B)	60,000
Net Current Assets (A - B)	4,84,500
Add: 20% safety margin	96,900
Working capital requirement	5,81,400

Note: Debtors has been calculated on the basis of cash cost. Alternatively, they can be calculated on sales basis as well.

MAY – 2018 – 10 Marks

Day Ltd. a newly formed company has applied to the Private Bank for the first time for financing its working capital requirements. The following information are available about the projects for the current year:

Estimated level of activity	Completed Units of Production 31,200 plus unit of work in progress 12,000
Raw Material Cost	₹ 40 per unit
Direct Wages Cost	₹ 15 per unit
Overheads	₹ 40 per unit (inclusive of depreciation ₹ 10 per unit)
Selling price	₹ 130 per unit

Raw material in stock	Average 30 days consumption
Work in Progress stock	Material 100% and Conversion cost 50%
Finished goods stock	24,000 units
Credit allowed by the supplier	30 days
Credit allowed to purchases	60 days
Direct wages (lag in payment)	15 days
Expected cash balance	₹ 2,00,000

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

Solution

Statement showing Working Capital Requirements of

Current Assets	Amount (₹)
Stock of raw material ($17,28,000 \times 30/360$)	1,44,000
Stock of work-in-progress [$12,000 \times (40 + 7.50 + 15)$]	7,50,000
Stock of finished goods [$24,000 \times (40 + 15 + 30)$]	20,40,000
Debtors for sale ($6,12,000 \times 60/360$)	1,02,000
Cash	2,00,000
Total Current Assets (A)	32,36,000
Current Liabilities	
Creditors for purchase ($18,72,000 \times 30/360$)	1,56,000
Creditors for wages ($5,58,000 \times 15/360$)	23,250
Total Current Liabilities (B)	1,79,250
Net working capital (A – B)	30,56,750

Working Note-1

Statement of Cost

Particulars	₹
Opening stock of raw material	-
Add: Purchases (Bal. fig.)	18,72,000
Less: Closing stock of raw material ($17,28,000 \times 30/360$)	(1,44,000)
Raw material consumed [$(31,200 \times 40) + (12,000 \times 40)$]	17,28,000
Add: Direct wages [$(31,200 \times 15) + (12,000 \times 15 \times 50\%)$]	5,58,000
Add: Overheads [$(31,200 \times 30) + (12,000 \times 30 \times 50\%)$]	11,16,000
Gross Factory Cost	34,02,000
Less: Closing work in progress [$12,000 \times (40 + 7.50 + 15)$]	(7,50,000)
Cost of goods produced	26,52,000
Less: Closing stock of finished goods ($26,52,000 \times 24,000/31,000$)	(20,40,000)
Cash cost of sales	6,12,000

Receivables Management

MAY – 2023 – 5 Marks

A company has current sale of ₹ 12 lakhs per year. The profit-volume ratio is 20% and post-tax cost of investment in receivables is 15%. The current credit terms are 1/10, net 50 days and average collection period is 40 days. 50% of customers in terms of sales revenue are availing cash discount and bad debt is 2% of sales.

In order to increase sales, the company want to liberalize its existing credit terms to 2/10, net 35 days. Due to which, expected sales will increase to ₹ 15 lakhs. Percentage of default in sales will remain same. Average collection period will decrease by 10 days. 80% of customers in terms of sales revenue are expected to avail cash discount under this proposed policy.

Tax rate is 30%. Advise, should the company change its credit terms (assume 360 days in a year).

Solution

Statement of Evaluation of Proposal

Particulars	Amount
Increase in contribution $(15,00,000 - 12,00,000)(20\%)(1 - 0.30)$	42,000
Incremental bad debts $[(15,00,000 - 12,00,000)(2\%)(1 - 0.30)]$	(4,200)
Incremental cash discount $[(15,00,000 \div 0.80 \div 2\%) - (12,00,000 \div 0.50 \div 1\%)](1 - 0.30)$	(12,600)
Saving in opportunity cost $[(15,00,000 \div 0.8 \div (30 \div 360) \div 15\%) - (12,00,000 \div 0.8 \div (40 \div 360) \div 15\%)]$	1,000
Incremental Profit	26,200

Proposed policy should be adopted since the net benefit is increased by ₹ 26,200.

DECEMBER – 2021 – 5 Marks

A factoring firm has offered a company to buy its accounts receivables. The relevant information is given below:

- The current average collection period for the company's debt is 80 days and ½% of debtors default. The factor has agreed to pay over money due to the company after 60 days and it will suffer all the losses of bad debts also.
- Factor will charge commission @2%.
- The company spends ₹ 1,00,000 p.a. on administration of debtor. These are avoidable costs.
- Annual credit sales are ₹ 90 lakhs. Total variable costs is 80% of sales. The variable costs is 80% of sales. The company's cost of borrowing is 15% per annum. Assume 365 days in a year.

Should the company enter into agreement with factoring firm?

Solution

Presently, the debtors of the company pay after 80 days. However, the factor has agreed to pay after 60 days only. So, the investment in debtors will be reduced by 20 days. The annual change in cash flows through entering into a factoring agreement is:

Particulars	₹
Factoring commission (90,00,000 × 2%)	(1,80,000)
Administration cost saved	1,00,000
Bad debts saved (90,00,000 × 0.50%)	45,000
Interest saving $\{ (90,00,000 \times 80/360) - (90,00,000 \times 60/360) \} \times 80\% \times 15\%$	59,178
Net Benefit	24,178

Recommended to enter into factoring agreement as it will provide annual benefit of ₹ 24,178.

JULY – 2021 – 5 Marks

Current annual sales of SKD Ltd. is ₹ 360 lakhs. Its directors are of the opinion that company's current expenditure on receivables management is too high and with a view to reduce the expenditure they are considering following two new alternative credit policies:

	Policy X	Policy Y
Average collection period	1.5 months	1 month
% of default	2%	1%
Annual collection expenditure	₹ 12 lakhs	₹ 20 lakhs

Selling price per unit of product is ₹ 150. Total cost per unit is ₹ 120.

Current credit terms are 2 months and percentage of default is 3%.

Current annual collection expenditure is ₹ 8 lakhs. Required rate of return on investment of SKD Ltd. is 20%. Determine which credit policy SKD Ltd. should follow.

Solution

Statement of Credit Policy Evaluation

Particulars	Policy X	Policy Y
Decrease in bad debts (working note – 1)	3,60,000	7,20,000
Increase in collection expenses	(4,00,000)	(12,00,000)
Increase in opportunity cost (working note – 2)	2,40,000	4,80,000
Net Benefit	2,00,000	0

Net benefit is higher in case of Policy X, thus Policy X should be followed.

Working Note - 1

Statement of Bad Debts Calculation

Particulars	Existing	Policy X	Policy Y
Sales	360,00,000	360,00,000	360,00,000
Bad Debts (in %)	3%	2%	1%
Bad Debts (in ₹)	10,80,000	7,20,000	3,60,000
Decrease in bad debts	-	3,60,000	7,20,000

Working Note - 2

Statement of Opportunity Cost Calculation

Particulars	Existing	Policy X	Policy Y
Total Cost [360 ÷ (120 ÷ 150)]	288,00,000	288,00,000	288,00,000
Average collection period	2 month	1.5 month	1 month
Average invest. in debtors	48,00,000	36,00,000	24,00,000
Decrease in invest. in debtors	-	12,00,000	24,00,000
Dec. in opportunity cost @ 20%	-	2,40,000	4,80,000

NOV – 2018 – 10 Marks

MN Ltd. has a current turnover of ₹ 30,00,000 p.a. Cost of sales is 80% of turnover and Bad Debts are 2% of turnover, cost of sales includes 70% variable cost and 30% fixed cost, while company's required rate of return is 15%. MN Ltd. currently allows 15 days credit to its customer, but it is considering increase this to 45 days credit in order to increase turnover. It has been estimated that this change in policy will increase turnover by 20%, while Bad Debts will increase by 1%. It is not expected that the policy change will result in an increase in fixed cost and creditors and stock will be unchanged.

Should MN Ltd. introduce the proposed policy? (Assume a 360 days year)

Solution

Statement of Credit Policy Evaluation

Particulars	Amount (₹)
Increase in contribution (30,00,000 × 20% × 44%)	2,64,000
Increase in bad debts (working note – 1)	(48,000)
Increase in opportunity cost (working note – 2)	(36,300)
Net Benefit	1,79,700

Since there is net benefit, thus it is recommended to implement the proposed policy.

Working Note – 1

Variable cost ratio = 80 × 70% = 56%; P/v Ratio = 100 - 56% = 44%

Fixed cost = 30,00,000 × 80% × 30% = ₹ 7,20,000

Statement of Bad Debts Calculation

Particulars	Existing	Proposed
Sales	30,00,000	36,00,000
Bad Debts (in %)	2%	3%
Bad Debts (in ₹)	60,000	1,08,000
Increase in bad debts	-	48,000

**Working Note - 2****Statement of Opportunity Cost Calculation**

Particulars	Existing	Proposed
Variable cost (sales × 56%)	16,80,000	20,16,000
Fixed cost	7,20,000	7,20,000
Total cost	24,00,000	27,36,000
Average credit period	15 days	45 days
Average invest. in debtors	1,00,000	3,42,000
Increase in invest. in debtors	-	2,42,000
Inc. in opportunity cost @ 15%	-	36,300



CASH MANAGEMENT & INVENTORY MANAGEMENT

NOV – 2022 – 5 Marks

K Ltd. has a Quarterly cash outflow of ₹ 9,00,000 arising uniformly during the Quarter. The company has an Investment portfolio of Marketable Securities. It plans to meet the demands for cash by periodically selling marketable securities. The marketable securities are generating a return of 12% p.a. Transaction cost of converting investments to cash is ₹ 60. The company uses Baumol model to find out the optimal transaction size for converting marketable securities into cash.

Consider 360 days in a year.

You are required to calculate:

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

Solution

(a) Annual cash outflows (U) = $9,00,000 \div 4 = ₹ 36,00,000$

Fixed cost per transaction (P) = ₹ 60

Opportunity cost of one rupee p.a. (S) = $\frac{12}{100} \times 1 = 0.12$

Optimum cash balance = $\sqrt{\frac{2 \times U \times P}{S}} = \sqrt{\frac{2 \times 36,00,000 \times 60}{0.12}} = ₹ 60,000$

Average cash balance = $\frac{60,000}{2} = ₹ 30,000$

(b) Number of conversions p.a. = $\frac{\text{Annual requirement}}{\text{Optimum cash balance}} = \frac{36,00,000}{60,000} = 60$

(c) Time interval between two conversion = $\frac{360}{\text{No. of conversions}} = \frac{360}{60} = 6 \text{ days}$

MAY – 2022 – 5 Marks

A company requires 36,000 units of a product per year at a cost of ₹ 100 per unit. Ordering cost per order is ₹ 250 and the carrying cost is 4.5% per year of the inventory cost. Normal lead time is 25 days and safety stock is NIL.

Assume 360 working days in a year.

- Calculate the Reorder Inventory Level

- (ii) Calculate the Economic Order Quantity (EOQ)
- (iii) If the supplier offers 1% quantity discount for purchase in lots of 9,000 units or more, should the company accept the proposal?

Solution

Annual requirement (A) = 36,000

Cost per order (O) = ₹ 250

Carrying cost per unit p.a. (C) = $100 \times 4.5\% = ₹ 4.50$

(i) Reorder level = Maximum lead time \div Maximum consumption = $25 \div \frac{36,000}{360} = 2,500$ units

(ii) $EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 36,000 \times 250}{4.50}} = 2,000$ units

(iii) **Statement of Cost**

Particulars	Order size = 2,000	Order size = 9,000
Purchase cost	$36,000 \times 100 = 36,00,000$	$36,000 \times (100 - 1\%) = 35,64,000$
Ordering cost	$\frac{36,000}{2,000} \times 250 = 4,50,000$	$\frac{36,000}{9,000} \times 250 = 1,00,000$
Carrying cost	$\frac{2,000}{2} \times 4.50 = 4,50,000$	$\frac{9,000}{2} \times \frac{4.5}{100} \times 99 = 20,048$
Total cost	36,09,000	35,85,048

Offer of discount should be accepted as it will have lower cost.

DECEMBER – 2021 – 5 Marks

A garment trader is preparing cash forecast for first three months of calendar year 2021. His estimated sales for the forecasted periods are as below:

	January (₹ '000)	February (₹ '000)	March (₹ '000)
Total Sales	600	600	800

- (i) The trader sells directly to public against cash payments and to other entities on credit. Credit sales are expected to be four times the value of direct sales to public. He expects 15% customers to pay in the month in which credit sales are made, 25% to pay in the next month and 58% to pay in the next to next month. The outstanding balance is expected to be written off.
- (ii) Purchase of goods are made in the month prior to sales and it amounts to 90% of sales and are made on credit. Payments of these occur in the month after the purchase. No inventories of goods are held.
- (iii) Cash balance as on 1st January, 2021 is ₹ 50,000.
- (iv) Actual sales for the last two months of calendar year 2020 are as below:

	November (₹ '000)	December (₹ '000)
Total Sales	640	880

You are required to prepare a monthly cash budget for the three months from January to March, 2021.

Solution

Given, Cash sales = 25% of credit sales

Thus, let credit sales = y \therefore Cash sales = $0.25y$

$\therefore y + 0.25y = \text{Total sales}$

$1.25y = \text{Total sales}$

$$y = \frac{\text{Total Sales}}{1.25}$$

$y = 80\%$ of total sales

Thus, Credit sales = 80% of total sales and Cash sales = 20% of total sales

Cash Budget

Particulars	Jan.	Feb.	March
Opening Balance (A)	50	174.96	355.28
Receipts			
20% of current month	120	120	160
12% of current month	72	72	96
20% of previous month	176	120	120
46.4% of previous to previous month	296.96	408.32	278.40
Total receipts (B)	664.96	720.32	654.40
Payments			
Creditors payment	540	540	720
Total payments (C)	540	540	720
Closing Balance (A + B - C)	174.96	355.28	289.68

NOV – 2019 – 10 Marks

Slide Ltd. is preparing a cash flow forecast for the three months period from January to the end of March. The following sales volumes have been forecasted:

Months	December	January	February	March	April
Sales (units)	1,800	1,875	1,950	2,100	2,250

Selling price per units ₹ 600. Sales are all on one month credit. Production of goods for sale takes place one month before sales. Each unit produced requires two units of raw material costing ₹ 150 per unit. No raw material inventory is held. Raw materials purchases are on one month credit. Variable overheads and wages equal to ₹ 100 per unit are incurred during production and paid in the month of production. The opening cash balance on 1st January is expected to be ₹ 35,000. A long term loan of ₹ 2,00,000 is expected to be received in the month of March. A machine costing ₹ 3,00,000 will be purchased in March.

- Prepare a cash budget for the months of January, February and March and calculate the cash balance at the end of each month in the three months period
- Calculate the forecast current ratio at the end of the three months period.

Solution

Working Notes:

- Calculation of Collection from Trade Receivables

Particulars	December	January	February	March
Sales (units)	1,800	1,875	1,950	2,100
Sales @ ₹ 600 per unit	10,80,000	11,25,000	11,70,000	12,60,000

Collection from debtors		10,80,000	11,25,000	11,70,000
-------------------------	--	-----------	-----------	-----------

2) Calculation of payment to Trade Payables:

Particulars	December	January	February	March
Output (units)	1,875	1,950	2,100	2,250
Raw Material (2 units per output)	3,750	3,900	4,200	4,500
Raw Material @ ₹ 150 per unit	5,62,500	5,85,000	6,30,000	6,75,000
Payment to creditors		5,62,500	5,85,000	6,30,000

3) Calculation of Variable Overheads and Wages:

Particulars	January	February	March
Output (units)	1,950	2,100	2,250
Payment in same month @ ₹ 100 per unit	1,95,000	2,10,000	2,25,000

(a) Preparation of Cash Budget

Particulars	January (₹)	February (₹)	March (₹)
Opening Balance (A)	35,000	3,57,500	6,87,500
Receipts:			
Collection from debtors	10,80,000	11,25,000	11,70,000
Receipt of long term loan	-	-	2,00,000
Total receipt (B)	10,80,000	11,25,000	13,70,000
Payments:			
Payment to creditors	5,62,500	5,85,000	6,30,000
Variable overheads and wages	1,95,000	2,10,000	2,25,000
Purchase of machinery	-	-	3,00,000
Total payments (C)	7,57,500	7,95,000	11,55,000
Closing Balance (A + B - C)	3,57,500	6,87,500	9,02,500

(b) Calculation of Current Ratios

Particulars	March (₹)
Inventory $[(2,250 \times 2 \times ₹ 150) + (2,250 \times 100)]$	9,00,000
Trade receivables	12,60,000
Cash Balance	9,02,500
Current Assets (A)	30,62,500
Trade payables	6,75,000
Current Liabilities (B)	6,75,000
Current Ratio (A ÷ B)	4.537

Ratio Analysis

MAY – 2023 – 10 Marks

Following information and ratios are given in respect of AQUA Ltd. for the year ended 31st March, 2023:

Current ratio	4.0
Acid test ratio	2.5
Inventory turnover ratio (based on sales)	6
Average collection period (days)	70
Earnings per share	3.5
Current liabilities	3,10,000
Total assets turnover ratio (based on sales)	0.96
Cash ratio	0.43
Proprietary ratio	0.48
Total equity dividend	1,75,000
Equity dividend coverage ratio	1.60

Assume 360 days in a year.

You are required to complete Balance Sheet as on 31st March, 2023.

Balance Sheet as on 31st March, 2023

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

Solution

(a) Current ratio = 4

$$\frac{\text{Current assets}}{\text{Current liabilities}} = 4$$

$$\text{Current assets} = 4 \div 3,10,000 = ₹ 12,40,000$$

(b) Acid test ratio = 2.5

$$\frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}} = 2.5$$

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

$$12,40,000 - \text{Inventory} = 7,73,000$$

$$\text{Inventory} = ₹ 4,65,000$$

- (c) Inventory turnover ratio (on sales) = 6

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

$$\text{Sales} = 6 \div 4,65,000 = ₹ 27,90,000$$

- (d) Debtors Collection period = 70 days

$$\frac{\text{Debtors}}{\text{Sales}} \times 360 = 70$$

$$\text{Debtors} = \frac{70}{360} \times 27,90,000 = ₹ 5,42,500$$

- (e) Total assets turnover ratio (on sales) = 0.96

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

$$\frac{27,90,000}{\text{Total assets}} = 0.96$$

$$\text{Total assets} = ₹ 29,06,250$$

- (f) Fixed assets = Total assets – current assets = 29,06,250 – 12,40,000 = ₹ 16,66,250

- (g) Cash ratio = $\frac{\text{Cash}}{\text{Current liabilities}} = 0.43$

$$\text{Cash} = 0.43 \div 29,06,250 = ₹ 1,33,300$$

- (h) Proprietary ratio = $\frac{\text{Proprietary fund}}{\text{Total assets}} = 0.48$

$$\frac{\text{Proprietary fund}}{29,06,250} = 0.48$$

$$\text{Proprietary fund} = ₹ 13,95,000$$

- (i) Equity dividend coverage ratio = 1.6

$$\frac{\text{Earning for Equity}}{\text{Equity Dividend}} = 1.6$$

$$\text{Earning for Equity} = 1.6(\text{Equity Dividend})$$

Divide both side by number of shares

$$\frac{\text{Earning for Equity}}{\text{No. of equity shares}} = 1.6 \times \frac{\text{Equity Dividend}}{\text{No. of equity shares}}$$

$$\text{EPS} = 1.6 (\text{DPS})$$

$$\text{DPS} = \frac{3.5}{1.6}$$

$$\text{DPS} = ₹ 2.1875$$

- (j) $\text{DPS} = \frac{\text{Total Dividend}}{\text{No. of equity shares}}$

$$2.1875 = \frac{1,75,000}{\text{No. of equity shares}}$$

$$\text{No. of equity shares} = 80,000$$

$$\text{Equity share capital} = 80,000 \div 10 = ₹ 8,00,000$$

$$\text{Reserve \& Surplus} = 13,95,000 - 8,00,000 = ₹ 5,95,000$$

(k) Loans and advances = Current assets – Inventory – Receivables – Cash & Bank
 = 12,40,000 – 4,65,000 – 5,42,500 – 1,33,000 = ₹ 99,200

Balance Sheet as on 31st March, 2023

Liabilities	₹	Assets	₹
Equity share capital (₹ 10 per share)	8,00,000	Fixed assets	16,66,250
Reserve & surplus	5,95,000	Inventory	4,65,000
Long-term debt (Bal. fig.)	12,01,250	Debtors	5,42,500
Current liabilities	3,10,000	Loans & advances	99,200
		Cash & bank	1,33,300
Total	29,06,250	Total	29,06,250

NOV – 2022 – 5 Marks

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

Total assets	-	₹ 10,00,000
Debt to total assets	-	50%
Interest cost	-	10% per year
Direct cost	-	10 times of the interest cost
Operating expenses	-	₹ 1,00,000

The goods are sold to customers at a margin of 50% on the direct cost. Tax rate is 30%. You are required to calculate:

- Net profit margin
- Net operating profit margin
- Return on assets
- Return on owner's equity

Solution

Amount of debt = 10,00,000 ÷ 50% = ₹ 5,00,000

Interest = 5,00,000 ÷ 10% = ₹ 50,000

Direct cost = 50,000 ÷ 10 = ₹ 5,00,000

Sales = 5,00,000 ÷ 150% = ₹ 7,50,000

Income Statement	
Particulars	Amount
Sales	7,50,000
(-) Direct costs	(5,00,000)
(-) Operating expenses	(1,00,000)
EBIT	1,50,000
(-) Interest	(50,000)
EBT	1,00,000
(-) Tax @ 30%	(30,000)
EAT	70,000

- (a) Net profit margin = $\frac{\text{Net Profit}}{\text{Sales}} \times 100 = \frac{70,000}{7,50,000} \times 100 = 10\%$
- (b) Net Operating profit margin = $\frac{\text{EBIT}}{\text{Sales}} \times 100 = \frac{1,50,000}{7,50,000} \times 100 = 20\%$
- (c) Return on Assets = $\frac{\text{EBIT}}{\text{Total Assets}} \times 100 = \frac{1,50,000}{10,00,000} \times 100 = 15\%$
- (d) Return on Owner's Equity = $\frac{\text{PAT}}{\text{Owner's Equity}} \times 100 = \frac{70,000}{5,00,000} \times 100 = 14\%$

MAY – 2022 – 5 Marks

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

Equity share capital of ₹ 10 each	₹ 10 lakhs
Reserve & Surplus to shareholder's fund	0.50
Sales / Shareholder's fund	1.50
Current ratio	2.50
Debtors Turnover Ratio	6.00
Stock Velocity	2 Months
Gross Profit Ratio	20%
Net Working Capital Turnover Ratio	2.50

You are required to calculate:

- (i) Shareholder's fund
- (ii) Stock
- (iii) Debtors
- (iv) Current liabilities
- (v) Cash Balance



Solution

(i) $\frac{\text{Reserve \& Surplus}}{\text{Shareholder's fund}} = 0.5$

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

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

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

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

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

$$\text{Shareholder's fund} = 10,00,000 + 10,00,000 = ₹ 20,00,000$$

(ii) Sales = 1.5 ÷ Shareholder's fund = 1.5 ÷ 20,00,000 = ₹ 30,00,000

$$\text{Gross profit} = \text{Sales} \div \text{GP Ratio} = 30,00,000 \div 20\% = ₹ 6,00,000$$

$$\text{Cost of goods sold (COGS)} = \text{Sales} - \text{Gross Profit} = 30,00,000 - 6,00,000 = ₹ 24,00,000$$

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

$$\frac{\text{Average stock}}{\text{COGS}} \times 12 = 2$$

$$\text{Average stock} = \frac{2 \times 24,00,000}{12} = ₹ 4,00,000$$

(iii) Debtors Turnover Ratio = 6

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

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

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

(iv) Net working capital turnover ratio = 2.5

$$\frac{\text{Sales}}{\text{Net working capital}} = 2.5$$

$$\frac{30,00,000}{\text{Net working capital}} = 2.5$$

$$\text{Net working capital} = 12,00,000$$

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

$$\text{Current Assets} = 12,00,000 + \text{Current Liabilities} \dots\dots\dots(1)$$

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

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

$$\text{Current Assets} = (2.5)\text{Current liabilities} \dots\dots\dots(2)$$

Put value of current assets from equation (1) in equation (2)

$$12,00,000 + \text{Current liabilities} = (2.5)\text{Current liabilities}$$

$$(1.5)\text{Current liabilities} = 12,00,000$$

$$\text{Current liabilities} = 8,00,000$$

$$\text{Thus, from equation (1), Current Assets} = 12,00,000 + 8,00,000 = ₹ 20,00,000$$

(v) Total current assets = Debtors + Stock + Cash balance

$$20,00,000 = 5,00,000 + 4,00,000 + \text{cash balance}$$

$$\text{Cash balance} = ₹ 11,00,000$$

DECEMBER – 2021 – 10 Marks

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

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

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

Required:

Complete the balance sheet of ABC Industries as on 31st March, 2021. All calculations should be in nearest rupee. Assume 360 days in a year.

Solution

Balance Sheet of ABC Industries as on 31st March, 2021

Liabilities	₹	Assets	₹
Equity Share Capital	20,00,000	Fixed assets	30,32,222
Reserve & surplus	10,00,000	Inventories	9,77,778
Long-term debts	9,00,000	Accounts receivable	8,00,000
Accounts payable	11,00,000	Cash	1,90,000
Total	50,00,000	Total	50,00,000

Note:

Working Notes:

(1) Total liabilities = Total assets = ₹ 50,00,000

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

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

$$\text{Debt} = ₹ 20,00,000$$

(2) Reserve & Surplus = Total liabilities – Equity capital – Debt
 $= 50,00,000 - 20,00,000 - 20,00,000 = ₹ 10,00,000$

(3) $\frac{\text{Long term debt}}{\text{Equity shareholder fund}} = 30\%$

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

$$\text{Long term debt} = ₹ 9,00,000$$

(4) Accounts payable = total debt - long term debt = 20,00,000 – 9,00,000 = ₹ 11,00,000

(5) COGS ratio = 100 – GP Ratio = 100 – 20% = 80% of sales

(6) Sales = $\frac{\text{Cost of goods sold}}{\text{COGS Ratio}} = \frac{64,00,000}{80\%} = ₹ 80,00,000$

(7) Closing inventory = $\frac{\text{Cost of goods sold}}{\text{Inventory days}} \times 360 = \frac{64,00,000}{55} \times 360 = ₹ 9,77,778$

(8) Account receivables = $\frac{\text{Credit sales}}{\text{Account receivable period}} \times 360 = \frac{80,00,000}{36} \times 360 = ₹ 8,00,000$

(9) Quick ratio = $\frac{\text{Quick assets}}{\text{Current liabilities}}$

$$0.90 = \frac{\text{Cash} + \text{Debtors}}{11,00,000}$$

$$\text{Cash} + 8,00,000 = 9,90,000$$

$$\text{Cash} = ₹ 1,90,000$$

(10) Fixed assets = Total assets – current assets
 $= 50,00,000 - (9,77,778 + 8,00,000 + 1,90,000) = ₹ 30,32,222$

JULY – 2021 – 10 Marks

Masco Limited has furnished the following ratios and information relating to the year ended 31st March 2021:

Sales	₹ 75,00,000
Return on net worth	25%
Rate of income tax	50%
Share capital to reserves	6:4
Current ratio	2.5
Net profit to sales (After Income Tax)	6.50%
Inventory turnover (based on cost of goods sold)	12

Cost of goods sold	₹ 22,50,000
Interest on debentures	₹ 75,000
Receivables (includes debtors ₹ 1,25,000)	₹ 2,00,000
Payables	₹ 2,50,000
Bank Overdraft	₹ 1,50,000

You are required to:

- Calculate the operating expenses for the year ended 31st March, 2021.
- Prepare a balance sheet as on 31st March in the following format:

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

Solution

- Calculation of operating expenses for the year ended 31st March, 2021

Particulars	(₹)
Net Profit (6.5% ÷ 75,00,000)	4,87,500
Add: Income Tax @ 50%	4,87,500
Profit before tax	9,75,000
Add: Debenture interest	75,000
Profit before interest and tax (A)	10,50,000
Sales	75,00,000
Less: COGS	22,50,000
Gross Profit (B)	52,50,000
Operating expenses (B – A)	42,00,000

- Balance Sheet as on 31st March, 2021

Liabilities	₹	Assets	₹
Share Capital	11,70,000	Fixed Assets	18,50,000
Reserve & Surplus	7,80,000	Current Assets	
15% Debentures	5,00,000	Stock	1,87,500
Payables	2,50,000	Receivables	2,00,000
Bank Overdraft	1,50,000	Cash	6,12,500
	28,50,000		28,50,000

Working Notes:

- Net worth = PAT ÷ 25% = 4,87,500 ÷ 25% = ₹ 19,50,000
- Ratio of Share capital to reserve is 6:4
Thus, Share capital = $19,50,000 \div \frac{6}{10} = ₹ 11,70,000$
Reserves = $19,50,000 \div \frac{4}{10} = ₹ 7,80,000$
- Value of Debentures = $\frac{\text{Interest Amount}}{\text{Interest rate}} = \frac{75,000}{15\%} = ₹ 5,00,000$

- (4) Total current liabilities = Bank overdraft + Payables = 1,50,000 + 2,50,000 = ₹ 4,00,000
 Given, current ratio = 2.5
 Thus, current assets = 2.5 ÷ current liabilities = 2.5 ÷ 4,00,000 = ₹ 10,00,000
- (5) Total liabilities = Net worth + Debentures + Current liabilities
 = 19,50,000 + 5,00,000 + 4,00,000 = ₹ 28,50,000
 Total assets = Total liabilities = ₹ 28,50,000
 Fixed assets = Total assets – Current assets = 28,50,000 – 10,00,000 = ₹ 18,50,000
- (6) Closing stock = $\frac{\text{Cost of goods sold}}{\text{Inventory turnover ratio}} = \frac{22,50,000}{12} = ₹ 1,87,500$
- (7) Cash = Current assets – Stock – Receivables = 10,00,000 – 1,87,500 – 2,00,000 = ₹ 6,12,500

JAN – 2021 – 5 Marks

From the following information, complete the Balance sheet given below:

- | | |
|------------------------------------|------------|
| (i) Equity | ₹ 2,00,000 |
| (ii) Total debt to owner's equity | 0.75 |
| (iii) Total assets turnover | 2 times |
| (iv) Inventory turnover | 8 times |
| (v) Fixed assets to owner's equity | 0.60 |
| (vi) Current debt to total debt | 0.40 |

Solution

Equity = 2,00,000

Total Debt = Equity ÷ 0.75 = 2,00,000 ÷ 0.75 = ₹ 1,50,000

Current Debt = total Debt ÷ 0.40 = 1,50,000 ÷ 0.40 = ₹ 60,000

Long term debt = 1,50,000 – 60,000 = ₹ 90,000

Fixed Assets = Equity ÷ 0.60 = 2,00,000 ÷ 0.60 = ₹ 1,20,000

Total Assets = Total Liabilities = Equity + Total Debt = 2,00,000 + 1,50,000 = ₹ 3,50,000

Current Assets = Total Assets – Fixed Assets = 3,50,000 – 1,20,000 = ₹ 2,30,000

Sales = 2 ÷ Total Assets = 2 ÷ 3,50,000 = ₹ 7,00,000

Inventory = $\frac{\text{Sales}}{\text{ITR}} = \frac{7,00,000}{8} = ₹ 87,500$

Other CA = Current Assets – Inventory = 2,30,000 – 87,500 = ₹ 1,42,500

Balance Sheet

Equity	2,00,000	Fixed Assets	1,20,000
Long Term Debt	90,000	Inventory	87,500
Current Debts	60,000	Other CA	1,42,500
	3,50,000		3,50,000

NOV – 2020 – 5 Marks

Following information relates to RM Co. Ltd.

	(₹)
Total Assets employed	10,00,000
Direct Cost	5,50,000
Other Operating Cost	90,000

Goods are sold to the customers at 150% of direct costs.

50% of the assets being financed by borrowed capital at an interest cost of 8% per annum.

Tax rate is 30%

You are required to calculate:

- (i) Net profit margin
- (ii) Return on Assets
- (iii) Asset turnover
- (iv) Return on owners' equity

Solution

$$(i) \text{ Net profit margin} = \frac{\text{Net Profit}}{\text{Sales}} \times 100 = \frac{1,01,500}{8,25,000} \times 100 = 12.30\%$$

$$(ii) \text{ Return on Assets} = \frac{\text{EBIT}}{\text{Total Assets}} \times 100 = \frac{1,85,000}{10,00,000} \times 100 = 18.50\%$$

$$(iii) \text{ Assets Turnover} = \frac{\text{Sales}}{\text{Total Assets}} = \frac{8,25,000}{10,00,000} = 0.825 \text{ times}$$

$$(iv) \text{ Return on owner's equity} = \frac{\text{Net Profit After Tax}}{\text{Owner's Equity}} \times 100 = \frac{1,01,500}{10,00,000 \times 50\%} \times 100 = 20.30\%$$

Working Notes:

$$1) \text{ Sales} = \text{Direct cost} \times 150\% = 5,50,000 \times 150\% = ₹ 8,25,000$$

$$2) \text{ EBIT} = \text{Sales} - \text{Direct cost} - \text{Operating cost} \\ = 8,25,000 - 5,50,000 - 90,000 = ₹ 1,85,000$$

$$3) \text{ Net Profit before tax} = \text{EBIT} - \text{Interest} \\ = 1,85,000 - (10,00,000 \times 50\% \times 8\%) = ₹ 1,45,000$$

$$4) \text{ Net Profit after tax} = 1,45,000 \times (1 - 0.30) = ₹ 1,01,500$$

NOV – 2019 – 5 Marks

Following information has been gathered from the books of Tram Ltd. the equity share of which is trading in the stock market at ₹ 14.

Particulars	Amount (₹)
Equity Share Capital (face value ₹ 10)	10,00,000
10% Preference Shares	2,00,000
Reserves	8,00,000
10% Debentures	6,00,000
Profit before Interest and Tax for the year	4,00,000
Interest	60,000
Profit after tax for the year	2,40,000

Calculate the following:

- (a) Return on Capital Employed
- (b) Earnings per share
- (c) PE Ratio

Solution

$$(a) \text{ Capital employed} = \text{Equity shareholder's fund} + \text{Debenture} + \text{Pref. shares} \\ = 10,00,000 + 8,00,000 + 6,00,000 + 2,00,000 = ₹ 26,00,000$$

$$\text{Return on capital employed (pre tax)} = \frac{EBIT}{\text{Capital Employed}} \times 100 = \frac{4,00,000}{26,00,000} \times 100 = 15.38\%$$

$$\text{Return on capital employed (post tax)} = \frac{EAT}{\text{Capital Employed}} \times 100 = \frac{2,40,000}{26,00,000} \times 100 = 9.23\%$$

$$(b) \text{ Earning per share} = \frac{\text{Earning available for equity holders}}{\text{No. of equity shares}} = \frac{2,40,000 - 20,000}{1,00,000} = ₹ 2.20$$

$$(c) \text{ PE Ratio} = \frac{MPS}{EPS} = \frac{14}{2.20} = 6.364$$

MAY – 2019 – 5 Marks

Following figures and ratios are related to a company of Q Ltd.:

Sales for the year (all credit)	₹ 30,00,000
Gross profit ratio	25%
Fixed assets turnover ratio (based on cost of goods sold)	1.5
Stock turnover ratio (based on cost of goods sold)	6
Liquid ratio	1:1
Current Ratio	1.5
Receivables (Debtors) collection period	2 months
Reserves & surplus to share capital	0.60:1
Capital gearing ratio	0.5
Fixed assets to net worth	1.20:1

You are required to calculate:

Closing stock, Fixed Assets, Current Assets, Debtors and Net Worth.

Solution

Calculation of Closing Stock:

$$\text{Sales for the year} = ₹ 30,00,000$$

$$\text{GP Ratio} = 25\%$$

$$\text{Gross Profit} = 30,00,000 \times 25\% = ₹ 7,50,000$$

$$\text{Cost of Goods Sold} = \text{Sales} - \text{Gross Profit} = 30,00,000 - 7,50,000 = ₹ 22,50,000$$

$$\text{Closing Stock} = \frac{\text{COGS}}{\text{Stock Turnover}} = \frac{22,50,000}{6} = ₹ 3,75,000$$

Calculation of Fixed Assets:

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

$$1.5 = \frac{22,50,000}{\text{Fixed Assets}}$$

$$\text{Fixed Assets} = \frac{22,50,000}{1.5} = ₹ 15,00,000$$

Calculation of Current Assets:

$$\text{Current Ratio} = 1.5$$

$$\frac{\text{Current Assets}}{\text{Current Liabilities}} = 1.5$$

$$\text{Current Assets} = \text{Current Liabilities} \times 1.5$$

$$\text{Also, Liquid Ratio} = 1$$

$$\frac{\text{Liquid Assets}}{\text{Current Liabilities}} = 1$$

$$\text{Liquid Assets} = \text{Current Liabilities}$$

Current Assets – Stock = Current Liabilities
 (1.5 × Current Liabilities) – 3,75,000 = Current Liabilities
 0.5 × Current Liabilities = 3,75,000
 Current Liabilities = 7,50,000
 Current Assets = 7,50,000 × 1.5 = ₹ 11,25,000

Calculation of Debtors:

$$\text{Debtors} = \frac{\text{Sales} \times \text{Debtors Collection Period}}{12} = \frac{30,00,000 \times 2}{12} = ₹ 5,00,000$$

Calculation of Net Worth:

$$1.20 = \frac{\text{Fixed Assets}}{\text{Net Worth}}$$

$$\text{Net Worth} = \frac{\text{Fixed Assets}}{1.20} = \frac{15,00,000}{1.20} = ₹ 12,50,000$$

NOV – 2018 – 5 Marks

The following is the information of XML Ltd. relate to the year ended 31-03-2018:

Gross Profit	20% of Sales
Net Profit	10% of sales
Inventory Holding Period	3 months
Receivable collection period	3 months
Non-current assets to sales	1:4
Non-current assets to current assets	1:2
Current Ratio	2:1
Non-current liabilities to current liabilities	1:1
Share capital to Reserve and Surplus	4:1
Non-current assets as on 31 st March, 2017	₹ 50,00,000

Assume that:

- (a) No change in Non-current assets during the year 2017-18
- (b) No depreciation changed on Non-Current Assets during the year
- (c) Ignoring tax

You are required to calculate cost of goods sold, net profit, inventory, receivables and cash for the year ended on 31st March, 2018.

Solution

Non-current assets to sale	= 1:4
Sales	= Non-current assets × 4 = 50,00,000 × 4 = ₹ 2,00,00,000
Net Profit	= 10% × Sales = 10% × 2,00,00,000 = ₹ 20,00,000
Cost of Goods Sold	= Sales – Gross Profit = 2,00,00,000 – (20% × 2,00,00,000) = ₹ 1,60,00,000
Inventory	= COGS × (3/12) = 1,60,00,000 × (3/12) = ₹ 40,00,000
Receivables	= Sales × (3/12) = 2,00,00,000 × (3/12) = ₹ 50,00,000

Non-Current Assets to current assets	= 1:2
Current Assets	= Non-current assets \times 2
	= 50,00,000 \times 2 = ₹ 1,00,00,000
Cash	= Current Assets – Inventory – Receivables
	= 1,00,00,000 – 40,00,000 – 50,00,000
	= ₹ 10,00,000

MAY – 2018 – 5 Marks

The accountant of Moon Ltd. has reported the following data:

Gross Profit	₹ 60,000
Gross profit Margin	20 per cent
Total Assets Turnover	0.30:1
Net Worth to Total Assets	0.90:1
Current Ratio	1.5:1
Liquid Assets to Current Liability	1:1
Credit sales to total sales	0.80:1
Average collection period	60 days

Assume 360 days in a year.

You are required to complete the following:

Balance Sheet of Moon Ltd.

Liabilities	₹	Assets	₹
Net Worth		Fixed Assets	
Current Liabilities		Stock	
		Debtors	
		Cash	
Total Liabilities		Total Assets	

Solution

Balance Sheet of Moon Ltd.

Liabilities	₹	Assets	₹
Net Worth	9,00,000	Fixed Assets	8,50,000
Current Liabilities	1,00,000	Stock	50,000
		Debtors	40,000
		Cash	60,000
Total Liabilities	10,00,000	Total Assets	10,00,000

Working Notes:

Sales	= Gross profit \div Gross Profit Margin
	= 60,000 \div 20% = ₹ 3,00,000
Total Assets	= Sales \div Total Assets Turnover
	= 3,00,000 \div 0.30 = ₹ 10,00,000
Net Worth	= 0.90 \times Total Assets
	= 0.90 \times 10,00,000 = ₹ 9,00,000
Current Liability	= Total Assets – Net Worth
	= 10,00,000 – 9,00,000 = ₹ 1,00,000
Current Assets	= 1.5 \times Current Liabilities



	$= 1.5 \times 1,00,000 = ₹ 1,50,000$
Liquid Assets	$= \text{Current Liabilities} \times 1$
	$= 1,00,000 \times 1 = ₹ 1,00,000$
Stock	$= \text{Current Assets} - \text{Liquid Assets}$
	$= 1,50,000 - 1,00,000 = ₹ 50,000$
Debtors	$= \text{Credit sales} \times (\text{Average collection period} \div 12)$
	$= 3,00,000 \times 0.80 \times (60/360) = ₹ 40,000$
Cash	$= \text{Current Assets} - \text{Stock} - \text{Debtors}$
	$= 1,50,000 - 50,000 - 40,000 = ₹ 60,000$
Fixed assets	$= \text{Total Assets} - \text{Current Assets}$
	$= 10,00,000 - 1,50,000 = ₹ 8,50,000$



Investment Decisions

MAY – 2023 – 10 Marks

Four years ago, Z Ltd. had purchased a machine of ₹ 4,80,000 having estimated useful life of 8 years with zero salvage value. Depreciation is charged using SLM method over the useful life. The company want to replace this machine with a new machine. Details of new machine are as below:

- Cost of new machine is ₹ 12,00,000, Vendor of this machine is agreed to take old machine at a value of ₹ 2,40,000. Cost of dismantling and removal of old machine will be ₹ 40,000. 80% of net purchase price will be paid on spot and remaining will be paid at the end of one year.
- Depreciation will be charged @ 20% p.a. under WDV method.
- Estimated useful life of new machine is four years and it has salvage value of ₹ 1,00,000 at the end of year four.
- Incremental annual sales revenue is ₹ 12,25,000.
- Contribution margin is 50%.
- Incremental indirect cost (excluding depreciation) is ₹ 1,18,750 per year.
- Additional working capital of ₹ 2,50,000 is required at the beginning of year and ₹ 3,00,000 at the beginning of year three. Working capital at the end of year four will be nil.
- Tax rate is 30%.
- Ignore tax on capital gain.

Z Ltd. will not make any additional investment, if it yields less than 12%.

Advice, whether existing machine should be replaced or not.

Year	1	2	3	4	5
PVIF _{0.12, t}	0.893	0.797	0.712	0.636	0.567

Solution

(i) Calculation of Net Initial Cash Outflow

Particulars	₹
Cost of New Machine	12,00,000
Less: Sale proceeds of existing machine	2,00,000
Net Purchase Price	10,00,000
Paid in year 0	8,00,000
Paid in year 1	2,00,000

(ii) Calculation of Additional Depreciation

Year	1	2	3	4
	₹	₹	₹	₹
Opening WDV of machine	10,00,000	8,00,000	6,40,000	5,12,000

Depreciation on new machine@ 20%	2,00,000	1,60,000	1,28,000	1,02,400
Closing WDV	8,00,000	6,40,000	5,12,000	4,09,600
Depreciation on old machine (4,80,000/8)	60,000	60,000	60,000	60,000
Incremental depreciation	1,40,000	1,00,000	68,000	42,400

(iii) Calculation of Annual Profit before Depreciation and Tax (PBDT)

Particulars	Incremental Values
Sales	12,25,000
Contribution	6,12,500
Less: Indirect Cost	<u>1,18,750</u>
Profit before Depreciation and Tax (PBDT)	4,93,750

Calculation of Incremental NPV

Year	PVF @ 12%	PBTD (₹)	Incremental Depreciation (₹)	PBT (₹)	Tax @ 30% (₹)	Cash Inflows (₹)	PV of Cash Inflows (₹)
	(1)	(2)	(3)	(4)	(5) = (4)×0.30	(6) = (4) – (5) + (3)	(7) = (6) x (1)
1	0.893	4,93,750	1,40,000	3,53,750	106,125	3,87,625	3,46,149.125
2	0.797	4,93,750	1,00,000	3,93,750	1,18,125	3,75,625	2,99,373.125
3	0.712	4,93,750	68,000	4,25,750	1,27,725	3,66,025	2,60,609.800
4	0.636	4,93,750	42,400	4,51,350	1,35,405	3,58,345	2,27,907.420
*						*	11,34,039.470
Add: PV of Salvage (1,00,000 x 0.636)							63,600
Less: Initial Cash Outflow – Year 0							8,00,000
Year 1 (2,00,000 × 0.893)							1,78,600
Less: Working Capital - Year 0							2,50,000
Year 2 (3,00,000 × 0.797)							2,39,100
Add: Working Capital released – Year 4 (5,50,000 × 0.636)							3,49,800
Incremental Net Present Value							79,739.470

Since the incremental NPV is positive, existing machine should be replaced.

NOV – 2022 – 10 Marks

A firm is in need of a small vehicle to make deliveries. It is intending to choose between two options. One option is to buy a new three wheeler that would cost ₹ 1,50,000 and will remain in service for 10 years.

The other alternative is to buy a second hand vehicle for ₹ 80,000 that could remain in service for 5 years. Thereafter the firm, can buy another second hand vehicle for ₹ 60,000 that will last for another 5 years. The scrap value of the discarded vehicle will be equal to its written down value (WDV). The firm pays 30% tax and is allowed to claim depreciation on vehicles @25% on WDV basis. The cost of capital of the firm is 12%.

You are required to advise the best option.

Given:

t	1	2	3	4	5	6	7	8	9	10
PVIF(t,12%)	0.892	0.797	0.711	0.635	0.567	0.506	0.452	0.403	0.360	0.322

Solution

Statement of Present Value of New Vehicle

Particulars	Year	Amount	PVF	PV
Cost of assets	0	1,50,000	1	1,50,000
Tax saving on Depreciation	1	$1,50,000 \div 25\% \div 30\% = 11,250$	0.892	(10,035)
	2	$1,12,500 \div 25\% \div 30\% = 8,437$	0.797	(6,724)
	3	$84,375 \div 25\% \div 30\% = 6,328$	0.711	(4,499)
	4	$63,281 \div 25\% \div 30\% = 4,746$	0.635	(3,014)
	5	$47,461 \div 25\% \div 30\% = 3,560$	0.567	(2,018)
	6	$35,596 \div 25\% \div 30\% = 2,670$	0.506	(1,351)
	7	$26,697 \div 25\% \div 30\% = 2,002$	0.452	(905)
	8	$20,023 \div 25\% \div 30\% = 1,502$	0.403	(605)
	9	$15,017 \div 25\% \div 30\% = 1,126$	0.360	(405)
	10	$11,263 \div 25\% \div 30\% = 845$	0.322	(272)
Scrap Value	10	8,447	0.322	(2,720)
			PVCI	1,17,452

Statement of Present Value of Second Hand Vehicle

Particulars	Year	Amount	PVF	PV
Cost of assets	0	80,000	1	80,000
	5	60,000	0.567	34,020
Tax saving on Depreciation	1	$80,000 \div 25\% \div 30\% = 6,000$	0.892	(5,352)
	2	$60,000 \div 25\% \div 30\% = 4,500$	0.797	(3,587)
	3	$45,000 \div 25\% \div 30\% = 3,375$	0.711	(2,400)
	4	$33,750 \div 25\% \div 30\% = 2,531$	0.635	(1,607)
	5	$25,313 \div 25\% \div 30\% = 1,898$	0.567	(1,076)
	6	$60,000 \div 25\% \div 30\% = 4,500$	0.506	(2,277)
	7	$45,000 \div 25\% \div 30\% = 3,375$	0.452	(1,525)
	8	$33,750 \div 25\% \div 30\% = 2,531$	0.403	(1,020)
	9	$25,313 \div 25\% \div 30\% = 1,898$	0.360	(683)

	10	$18,985 \div 25\% \div 30\% = 1,424$	0.322	(459)
Scrap Value	5	18,985	0.567	(10,764)
	10	14,239	0.322	(4,585)
			PVCI	78,685

The PV of cash outflow is lower in case of buying second hand vehicles. Thus, it is advisable to buy second hand vehicles.

NOV – 2022 – 10 Marks

A hospital is considering to purchase a diagnostic machine costing ₹ 80,000. The projected life of the machine is 8 years and has an expected salvage value of ₹ 6,000 at the end of 8 years. The annual operating cost of the machine is ₹ 7,500. It is expected to generate revenues of ₹ 40,000 per year for 8 years. Presently the hospital is outsourcing the diagnostic work and is earning commission income of ₹ 12,000 per annum. Consider tax rate of 30% and discounting rate as 10%.

Advise, whether it would be profitable for the hospital to purchase the machine?

Give your recommendations as per Net Present Value method and Present Value Index under below mentioned two situations:

- If commission income of ₹ 12,000 p.a. is before taxes
- If commission income of ₹ 12,000 p.a. is net of taxes

Given:

t	1	2	3	4	5	6	7	8
PVIF(t,10%)	0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467

Solution

Analysis of Investment Decisions

Determination of Cash inflows	Situation-(i) Commission Income before taxes	Situation-(ii) Commission Income after taxes
Cash flow up-to 7 th year:	40,000	40,000
Sales Revenue	(7,500)	(7,500)
Less: Operating Cost	32,500	32,500
Less: Depreciation $(80,000 - 6,000) \div 8$	(9,250)	(9,250)
Net Income	23,250	23,250
Tax @ 30%	(6,975)	(6,975)
Earnings after Tax (EAT) Add:	16,275	16,275
Depreciation	9,250	9,250
Cash inflow after tax per annum	25,525	25,525
Less: Loss of Commission Income	(8,400)	(12,000)

Net Cash inflow after tax per annum	17,125	13,525
In 8th Year		
Net Cash inflow after tax	17,125	13,525
Add: Salvage Value of Machine	6,000	6,000
Net Cash inflow in year 8	23,125	19,525

Calculation of NPV and Profitability Index

	Particulars	PV factor @10%	Situation-(i) [Commission Income before taxes]	Situation-(ii) [Commission Income after taxes]
A	Present value of cash inflows (1 st to 7 th year)	4.867	83,347.38 (17,125 × 4,867)	65,826.18 (13,525 × 4.867)
B	Present value of cash inflow at 8 th year	0.467	10,799.38 (23,125 × 0.467)	9,118.18 (19,525 × 0.467)
C	PV of cash inflows		94,146.76	74,944.36
D	Less: Cash Outflow	1.00	(80,000)	(80,000)
E	Net Present Value (NPV)		14,146.76	(5,055.64)
F	PI = (C ÷ D)		1.18	0.94

Recommendation: The hospital may consider purchasing of diagnostic machine in situation (i) where commission income is 12,000 before tax as NPV is positive and PI is also greater than 1. Contrary to situation (i), in situation (ii) where the commission income is net of tax, the recommendation is reversed to not purchase the machine as NPV is negative and PI is also less than 1.

MAY – 2022 – 10 Marks

Alpha limited is a manufacturer of computers. It wants to introduce artificial intelligence while making computers. The estimated annual saving from introduction of the artificial intelligence (AI) is as follows:

- Reduction of five employees with annual salaries of ₹ 3,00,000 each.
- Reduction of ₹ 3,00,000 in production delays caused by inventory problem
- Reduction in lost sales ₹ 2,50,000 and
- Gain due to timely billing ₹ 2,00,000

The purchase price of the system for installation of artificial intelligence is ₹ 20,00,000 and installation cost is ₹ 1,00,000. 80% of the purchase price will be paid in the year of purchase and remaining will be paid in next year. The estimated life of the system is 5 years and it will be depreciated on a straight-line basis.

However, the operation of the new system requires two computer specialists with annual salaries of ₹ 5,00,000 per person.

In addition to above, annual maintenance and operating cost for five years are as below:

(Amount in ₹)

Year	1	2	3	4	5
Maintenance & Operating cost	2,00,000	1,80,000	1,60,000	1,40,000	1,20,000

Maintenance and operating cost are payable in advance.

The company's tax rate is 30% and its required rate of return is 15%.

Year	1	2	3	4	5
PVIF _{0.10,t}	0.909	0.826	0.751	0.683	0.621
PVIF _{0.12,t}	0.893	0.797	0.712	0.636	0.567
PVIF _{0.15,t}	0.870	0.756	0.658	0.572	0.497

Evaluate the project by using Net Present Value and Profitability Index.

Solution

Calculation of Cash Flows

Particulars	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Saving in Salaries		15,00,000	15,00,000	15,00,000	15,00,000	15,00,000
Reduction in production delays		3,00,000	3,00,000	3,00,000	3,00,000	3,00,000
Reduction in lost sales		2,50,000	2,50,000	2,50,000	2,50,000	2,50,000
Gain due to Timely Billing		2,00,000	2,00,000	2,00,000	2,00,000	2,00,000
Salary to computer specialist		(10,00,000)	(10,00,000)	(10,00,000)	(10,00,000)	(10,00,000)
Maintenance & Operating cost		(2,00,000)	(1,80,000)	(1,60,000)	(1,40,000)	(1,20,000)
Depreciation		(4,20,000)	(4,20,000)	(4,20,000)	(4,20,000)	(4,20,000)
Profit before tax		6,30,000	6,50,000	6,70,000	6,90,000	7,10,000
Less: Tax @ 30%		(1,89,000)	(1,95,000)	(2,01,000)	(2,07,000)	(2,13,000)
Add: Depreciation		4,20,000	4,20,000	4,20,000	4,20,000	4,20,000
Add: Maintenance & Operating cost		2,00,000	1,80,000	1,60,000	1,40,000	1,20,000

Less: Maintenance & Operating cost	(2,00,000)	(1,80,000)	(1,60,000)	(1,40,000)	(1,20,000)	-
Net CF	(2,00,000)	8,81,000	8,95,000	9,09,000	9,23,000	10,37,000

Statement of NPV

Particulars	Time	PVF	Amount	Present Value
Initial Investment	0	1	16,00,000	16,00,000
Installation expenses	0	1	1,00,000	1,00,000
Installment of Purchase Price	1	0.870	4,00,000	3,48,000
			PVCO	20,48,000
Cash flows	0	1	(2,00,000)	(2,00,000)
	1	0.870	8,81,000	7,66,470
	2	0.756	8,95,000	6,67,620
	3	0.658	9,09,000	5,98,122
	4	0.572	9,23,000	5,27,956
	5	0.497	10,37,000	5,15,389
			PVCI	28,84,557
NPV (PVCI – PVCO)				8,36,557
Profitability Index (PVCI ÷ PVCO)				1.41

Since, NPV is positive and Profitability index is greater than one, thus it is recommended to introduce the system.

DECEMBER – 2021 – 10 Marks

Stand Ltd. is contemplating replacement of one of its machines which has become outdated and inefficient. Its financial manager has prepared a report outlining two possible replacement machines. The details of each machine are as follows:

	Machine 1	Machine 2
Initial investment	₹ 12,00,000	₹ 16,00,000
Estimated useful life	3 years	5 years
Residual value	₹ 1,20,000	₹ 1,00,000
Contribution per annum	₹ 11,60,000	₹ 12,00,000
Fixed maintenance costs per annum	₹ 40,000	₹ 80,000
Other fixed operating cost per annum	₹ 7,20,000	₹ 6,10,000

The maintenance costs are payable annually in advance. All other cash flows apart from the initial investment assumed to occur at the end of each year. Depreciation has been calculated by straight line method and has been included in other fixed operating costs. The expected cost of capital for this project is assumed at 12%p.a.

Required to compute which machine is more beneficial, using annualized equivalent approach. Ignore tax.

Year	1	2	3	4	5	6
PVIF _{0.12,t}	0.893	0.797	0.712	0.636	0.567	0.507
PVIFA _{0.12,t}	0.893	1.690	2.402	3.038	3.605	4.112

Solution

Statement of Calculation of Cash Flows of Machine-1

Particulars	Year 0	Year 1	Year 2	Year 3
Initial investment	(12,00,000)	-	-	-
Contribution	-	11,60,000	11,60,000	11,60,000
Fixed maintenance cost	(40,000)	(40,000)	(40,000)	-
Other fixed operating cost*	-	(3,60,000)	(3,60,000)	(3,60,000)
Residual value	-	-	-	1,20,000
Net Cash flow	(12,40,000)	7,60,000	7,60,000	9,20,000

*Other fixed operating cost (excluding depreciation) = $7,20,000 - \left(\frac{12,00,000 - 1,20,000}{3}\right) = 3,60,000$

Statement of Calculation of Cash Flows of Machine-2

Particulars	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Initial invest.	(16,00,000)	-	-	-	-	-
Contribution	-	12,00,000	12,00,000	12,00,000	12,00,000	12,00,000
Fixed maint. Cost	(80,000)	(80,000)	(80,000)	(80,000)	(80,000)	(80,000)
Other fixed operating cost*	-	(3,10,000)	(3,10,000)	(3,10,000)	(3,10,000)	(3,10,000)
Residual value	-	-	-	-	-	1,00,000
Net Cash flow	(16,80,000)	8,10,000	8,10,000	8,10,000	8,10,000	9,10,000

*Other fixed operating cost (excluding depreciation) = $6,10,000 - \left(\frac{16,00,000 - 1,00,000}{5}\right) = 3,10,000$

Statement of NPV

Year	PVF@12%	Machine 1		Machine 2	
		Cash Flow	Present Value	Cash Flow	Present Value
0	1.000	(12,40,000)	(12,40,000)	(16,80,000)	(16,80,000)
1	0.893	7,60,000	6,78,680	8,10,000	7,23,330
2	0.797	7,60,000	6,05,720	8,10,000	6,45,570
3	0.712	9,20,000	6,55,040	8,10,000	5,76,720
4	0.636	-	-	8,10,000	5,15,160
5	0.567	-	-	9,10,000	5,61,330
	NPV		6,99,440		13,42,110
	PVAF		2.402		3.605
			2,91,191		3,72,291

Machine 2 is better as it has more equivalent annualized NPV.

Calculation of Sensitivity

Difference in equivalent annualized NPV = $3,72,291 - 2,91,191 = ₹ 81,100$

Contribution of Machine 1 = ₹ 11,60,000

Sensitivity relating to contribution of machine 1 = $\frac{81,100}{11,60,000} \times 100 = 7\%$

JULY – 2021 – 10 Marks

An existing company has a machine which has been in operation for two years, its estimated remaining useful life is 4 years with no residual value in the end. Its current market value is ₹ 3 lakhs. The management is considering a proposal to purchase an improved model of a machine gives increase output. The details are as under:

Particulars	Existing Machine	New Machine
Purchase Price	₹ 6,00,000	₹ 10,00,000
Estimated Life	6 years	4 years
Residual Value	0	0
Annual Operating days	300	300
Operating hours per day	6	6
Selling price per unit	₹ 10	₹ 10
Material cost per unit	₹ 2	₹ 2
Output per hour in units	20	40
Labour cost per hour	₹ 20	₹ 30
Fixed overhead per annum excluding depreciation	₹ 1,00,000	₹ 60,000
Working Capital	₹ 1,00,000	₹ 2,00,000
Income-tax rate	30%	30%

Assuming that - cost of capital is 10% and the company uses written down value of depreciation @ 20% and it has several machines in 20% block.

Advice the management on the Replacement of Machine as per the NPV method. The discounting factors table given below:

Discounting Factors	Year 1	Year 2	Year 3	Year 4
10%	0.909	0.826	0.751	0.683

Solution

Statement of NPV

Particulars	Time	PVF	Amount	Present Value
Cost of new machine	0	1	10,00,000	10,00,000
(+) Add. working cap. (2,00,000 – 1,00,000)	0	1	1,00,000	1,00,000
(-) Cash flow from sale of old assets	0	1	(3,00,000)	(3,00,000)
			PVCO	8,00,000
Incremental Cash flows (w.n.-1)	1	0.909	2,59,000	2,35,431
	2	0.826	2,50,600	2,06,996
	3	0.751	2,43,880	1,83,154
	4	0.683	2,38,504	1,62,898
Incremental working capital realization	4	0.683	1,00,000	68,300

		PVCI	8,56,779
	NPV (PVCI – PVCO)		56,779

Since the incremental NPV is positive, thus existing machine should be replaced.

Working Note – 1: Calculation of profit before depreciation (PBD)

Particulars	Existing Machine	New Machine
Annual output	$300 \div 6 \div 20 = 36,000$	$300 \div 6 \div 40 = 72,000$
Sales @ ₹ 10 per unit	3,60,000	7,20,000
Less: Cost of operation		
Material @ ₹ 2 per unit	72,000	1,44,000
Labour	$1800 \div 20 = 36,000$	$1800 \div 30 = 54,000$
Fixed OHs	1,00,000	60,000
Profit before Depreciation	1,52,000	4,62,000

Thus, Annual Incremental Profit Before Depreciation = 4,62,000 – 1,52,000 = ₹ 3,10,000

Working Note – 2: Calculation of basis of depreciation

Particulars	Existing	After Replacement
Purchase price of existing	6,00,000	6,00,000
Less: Depreciation of Yr. 1	1,20,000	1,20,000
Less: Depreciation of Yr. 2	96,000	96,000
WDV of existing machine	3,84,000	3,84,000
Add: Purchase of new	-	10,00,000
Less: Sale of existing	-	3,00,000
Basis for Depreciation	3,84,000	10,84,000

Working Note – 3: Incremental cash flow from sale of assets

Particulars	Year 1	Year 2	Year 3	Year 4
Incremental PBD (A)	3,10,000	3,10,000	3,10,000	3,10,000
New Depreciation	2,16,800	1,73,440	1,38,752	1,11,002
Less: Existing Depreciation	76,800	61,440	49,152	39,322
Incremental Depreciation (B)	1,40,000	1,12,000	89,600	71,680
Incremental PBT (A – B)	1,70,000	1,98,000	2,20,400	2,38,320
Tax @ 30% (C)	51,000	59,400	66,120	71,496
Incremental CFs (A – C)	2,59,000	2,50,600	2,43,880	2,38,504

JAN – 2021 – 10 Marks

A company wants to buy a machine, and two different models namely A and B are available. Following further particulars are available:

Particulars	Machine – A	Machine – B
Original Cost (₹)	8,00,000	6,00,000
Estimated Life in years	4	4
Salvage Value (₹)	0	0

The company provides depreciation under straight line method. Income tax rate applicable is 30%.

The present value of ₹ 1 at 12% discounting factor and net profit before depreciation and tax are as under:

Year	Net Profit Before Depreciation and tax		PV Factor
	Machine – A (₹)	Machine – B (₹)	
1	2,30,000	1,75,000	0.893
2	2,40,000	2,60,000	0.797
3	2,20,000	3,20,000	0.712
4	5,60,000	1,50,000	0.636

Calculate:

- (1) NPV (Net Present Value)
- (2) Discounted pay-back period
- (3) PI (Profitability Index)

Suggest: Purchase of which is more beneficial under Discounted pay-back period method, NPV method and PI method.

Solution

Statement of Cash flows and PV of Cash flows of Machine A

Year	CFBT	Depreciation	PBT	Tax@30%	CFAT	PVF	PVCI
	A	B	C=A-B	D=C×30%	E=A-D	F	E×F
1	2,30,000	2,00,000	30,000	9,000	2,21,000	0.893	1,97,353
2	2,40,000	2,00,000	40,000	12,000	2,28,000	0.797	1,81,716
3	2,20,000	2,00,000	20,000	6,000	2,14,000	0.712	1,52,368
4	5,60,000	2,00,000	3,60,000	1,08,000	4,52,000	0.636	2,87,472
Total					11,15,000		8,18,909

Statement of Cash flows and PV of Cash flows of Machine B

Year	CFBT	Depreciation	PBT	Tax@30%	CFAT	PVF	PVCI
	A	B	C=A-B	D=C×30%	E=A-D	F	E×F
1	1,75,000	1,50,000	25,000	7,500	1,67,500	0.893	1,49,578
2	2,60,000	1,50,000	1,10,000	33,000	2,27,000	0.797	1,80,919
3	3,20,000	1,50,000	1,70,000	51,000	2,69,000	0.712	1,91,528
4	1,50,000	1,50,000	-	-	1,50,000	0.636	95,400
Total					8,13,500		6,17,425

- (1) NPV of Machine A = PVCI – PVCO = 8,18,909 – 8,00,000 = ₹ 18,909
NPV of Machine B = PVCI – PVCO = 6,17,909 – 6,00,000 = ₹ 17,909

- (2) Statement of Cumulative PVCI

	Year 1	Year 2	Year 3	Year 4
PVCI – Machine A	1,97,353	1,81,716	1,52,368	2,87,472
Cumulative PVCI – Machine A	1,97,353	3,79,069	5,31,437	8,16,909
PVCI – Machine B	1,49,578	1,80,919	1,91,528	95,400
Cumulative PVCI – Machine B	1,49,578	3,30,497	5,22,025	6,17,425

Discounted Pay-back period of Machine A = $3 + \frac{(8,00,000 - 5,31,437)}{2,87,472} = 3.93$ years

Discounted Pay-back period of Machine B = $3 + \frac{(6,00,000 - 5,22,025)}{95,400} = 3.82$ years

(3) Profitability Index of Machine A = $\frac{PVCI}{PVCO} = \frac{8,18,909}{8,00,000} = 1.024$

Profitability Index of Machine B = $\frac{PVCI}{PVCO} = \frac{6,17,425}{6,00,000} = 1.029$

Method	Recommendation
Discounted Pay-back period	Machine B as it has lower discounted pay-back period
NPV	Machine A as it has higher NPV
Profitability Index	Machine B as it has higher PI

NOV – 2020 – 5 Marks

CK Ltd. is planning to buy a new machine. Details of which are as follows:

Cost of the Machine at the commencement	₹ 2,50,000
Economic Life of the Machine	8 years
Residual Value	Nil
Annual Production Capacity of the machine	1,00,000 units
Estimated Selling Price per unit	₹ 6
Estimated annual fixed cost (excluding depreciation)	₹ 1,00,000
Estimated variable cost per unit (excluding depreciation)	₹ 3
Advertisement expenses in 1 st year in addition of annual fixed cost	₹ 20,000
Maintenance expenses in 5 th year in addition of annual fixed cost	₹ 30,000
Cost of capital	12%
Ignore tax	

Analyze the above mentioned proposal using the Net Present Value Method and advice.

PV Factor at 12% are as under:

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

Solution

Statement of Present Value of Cash Flows

Particulars	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Units	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000
Contribution per unit (6-3)	3	3	3	3	3	3	3	3
Total Contribution	3,00,000	3,00,000	3,00,000	3,00,000	3,00,000	3,00,000	3,00,000	3,00,000
(-) Fixed Cost	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000
(-) Advert.	20,000	-	-	-	-	-	-	-
(-) Maint.	-	-	-	-	30,000	-	-	-
Profit Before Dep. or CF	1,80,000	2,00,000	2,00,000	2,00,000	1,70,000	2,00,000	2,00,000	2,00,000
PVF @ 12%	0.893	0.797	0.712	0.636	0.567	0.507	0.452	0.404

Present Value	1,60,740	1,59,400	1,42,400	1,27,200	96,390	1,01,400	90,400	80,800
---------------	----------	----------	----------	----------	--------	----------	--------	--------

Total Present value of cash inflows = 9,58,730 (from above table)

NPV = PVCI – PVCO = 9,58,730 – 2,50,000 = ₹ 7,08,730

It is recommended to accept the proposal as it has positive NPV.

NOV – 2019 – 5 Marks

A company has ₹ 1,00,000 available for investment and has identified the following four investments in which to invest.

Project	Investment (₹)	NPV (₹)
C	40,000	20,000
D	1,00,000	35,000
E	50,000	24,000
F	60,000	18,000

You are required to optimize the returns from a package of projects within the capital spending limit if:

- The projects are independent of each other and are divisible
- The projects are not divisible

Solution

(a) **Computation of NPV per ₹ 1 of investment and Ranking of Projects**

Project	Investment (₹)	NPV (₹)	NPV per ₹ 1 invested (₹)	Ranking
C	40,000	20,000	0.50	1
D	1,00,000	35,000	0.35	3
E	50,000	24,000	0.48	2
F	60,000	18,000	0.30	4

Calculation of Package of Projects

Project	Investment (₹)	NPV (₹)
C	40,000	20,000
E	50,000	24,000
D (1/10 th of Project)	10,000	3,500
Total	1,00,000	47,500

The company would be well advised to invest in Project C, E and D (1/10th) and reject Project F to optimize return within the amount of ₹ 1,00,000 available for investment.

(b) **Calculation of Package of Projects**

Package of Project	Investment (₹)	NPV (₹)
C and E	90,000 (40,000 + 50,000)	44,000 (20,000 + 24,000)
C and F	1,00,000 (40,000 + 60,000)	38,000 (20,000 + 18,000)
Only D	1,00,000	35,000

The company would be well advised to invest in Projects C and E to optimize return within the amount of ₹ 1,00,000 available for investment.

MAY – 2019 – 10 Marks

AT Limited is considering three projects A, B and C. The cash flows associated with the projects are given below:

Cash flows associated with the Three Projects (₹)

Project	C ₀	C ₁	C ₂	C ₃	C ₄
A	(10,000)	2,000	2,000	6,000	0
B	(2,000)	0	2,000	4,000	6,000
C	(10,000)	2,000	2,000	6,000	10,000

You are required to:

- Calculate the payback period of each of the three projects.
- If the cut-off period is two years, then which projects should be accepted?
- Projects with positive NPVs if the opportunity cost of capital is 10%.
- “Payback gives too much weight to cash flows that occur after the cut-off date” True or false?
- “If a firm used a single cutoff period for all projects, it is likely to accept too many short-lived projects.” True or false?

PV Factor @ 10%

Year	0	1	2	3	4	5
P.V.	1	0.909	0.826	0.751	0.683	0.621

Solution

Year	Project A		Project B		Project C	
	CF	Cumulative	CF	Cumulative	CF	Cumulative
1	2,000	2,000	0	0	2,000	2,000
2	2,000	4,000	2,000	2,000	2,000	4,000
3	6,000	10,000	4,000	6,000	6,000	10,000
4	-	-	6,000	12,000	10,000	20,000

- Payback period of Project A = 3 years
Payback period of Project B = 2 years
Payback period of Project C = 3 years
- Project B is the only acceptable project if cut-of period is 2 years.

(c) **Statement of NPV**

Year	PVF @10%	Project A		Project B		Project C	
		CF	PV	CF	PV	CF	PV
0	1	(10,000)	(10,000)	(2,000)	(2,000)	(10,000)	(10,000)
1	0.909	2,000	1,818	-	-	2,000	1,818
2	0.826	2,000	1,652	2,000	1,652	2,000	1,652
3	0.751	6,000	4,506	4,000	3,004	6,000	4,506
4	0.683	-	-	6,000	4,098	10,000	6,830
NPV			(2,024)		6,754		4,806

Project B and C have positive NPVs.

- (d) Payback period doesn't give weightage to the cash flows after the cut off date so the statement given is false.
- (e) The statement given is true. Payback period ignores all cash flows after the cut off date which means that future cash flows are not considered. Thus, payback period is biased towards short-term projects.

NOV – 2018 – 10 Marks

PD Ltd. an existing company, is planning to introduce a new product with projected life of 8 years. Project cost will be ₹ 2,40,00,000. At the end of 8 years no residual value will be realized. Working capital of ₹ 30,00,000 will be needed. The 100% capacity of the project is 2,00,000 units p.a. but the Production and Sales Volume is expected are as under:

Year	Number of Units
1	60,000 units
2	80,000 units
3 – 5	1,40,000 units
6 – 8	1,20,000 units

Other information:

- (i) Selling price per unit ₹ 200
 (ii) Variable cost is 40% of sales
 (iii) Fixed cost p.a. ₹ 30,00,000
 (iv) In addition to this advertisement expenditure will have to be incurred as under:

Year	1	2	3 – 5	6 - 8
Expenditure (₹)	50,00,000	25,00,000	10,00,000	5,00,000

- (v) Income tax is 25%
 (vi) Straight line method of depreciation is permissible for tax purpose
 (vii) Cost of capital is 10%
 (viii) Assume that loss cannot be carried forward.

Present Value Table

Year	1	2	3	4	5	6	7	8
PVF @ 10%	0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467

Solution

Statement of NPV

Particulars	Time	PVF	Amount	Present Value
Cost of equipment	0	1	2,40,00,000	2,40,00,000
Working capital	0	1	30,00,000	30,00,000
			PVCO	2,70,00,000
Incremental Cash flows (w.n.-1)	1	0.909	(8,00,000)	(7,27,200)
	2	0.826	38,25,000	31,59,450
	3-5	2.055	1,03,50,000	2,12,69,250
	6-8	1.544	89,25,000	1,37,80,200

Working capital realization	8	0.467	30,00,000	14,01,000
			PVCI	3,88,82,700
NPV (PVCI – PVCO)				1,18,82,700

It is recommended to accept the project in view of positive NPV.

Working Note – 1

Year	1	2	3-5	6-8
Sales (units)	60,000	80,000	1,40,000	1,20,000
Contribution @ ₹ 120 p.u.	72,00,000	96,00,000	1,68,00,000	1,44,00,000
Fixed Cost	30,00,000	30,00,000	30,00,000	30,00,000
Advertisement	50,00,000	25,00,000	10,00,000	5,00,000
PBD (A)	(8,00,000)	41,00,000	1,28,00,000	1,09,00,000
Depreciation	30,00,000	30,00,000	30,00,000	30,00,000
PBT	(38,00,000)	11,00,000	98,00,000	79,00,000
Tax @ 25% (B)	-	2,75,000	24,50,000	19,75,000
Cash Inflow (A - B)	(8,00,000)	38,25,000	1,03,50,000	89,25,000

MAY – 2018 – 10 Marks

A company is evaluating a project that requires initial investment of ₹ 60 lakhs in fixed assets and ₹ 12 lakhs towards additional working capital.

The project is expected to increase annual real cash inflow before taxes by ₹ 24,00,000 during its life. The fixed assets would have zero residual value at the end of life of 5 years. The company follows straight line method of depreciation which is expected for tax purposes also. Inflation is expected to be 6% per year. For evaluating similar projects, the company uses discounting rate of 12% in real terms. Company's tax rate is 30%.

Advise whether the company should accept the project, by calculating NPV in real terms.

PVIF (12%, 5 years)		PVIF (6%, 5 years)	
Year 1	0.893	Year 1	0.943
Year 2	0.797	Year 2	0.890
Year 3	0.712	Year 3	0.840
Year 4	0.636	Year 4	0.792
Year 5	0.567	Year 5	0.747

Solution

Statement of NPV

Particulars	Time	PVF	Amount	Present Value
Cost of equipment	0	1	60,00,000	60,00,000
Working capital	0	1	12,00,000	12,00,000
			PVCO	72,00,000
Cash flows (w.n.-1)	1-5	3.605	24,60,000	73,54,200
Working capital realization	5	0.567	12,00,000	6,80,400
			PVCI	80,34,600
NPV (PVCI – PVCO)				8,34,600



It is recommended to accept the project in view of positive NPV.

Working Note – 1

Year	1
PBD (A)	24,00,000
Depreciation (60,00,000 ÷ 5)	12,00,000
PBT	12,00,000
Tax @ 30% (B)	3,60,000
Cash Inflow (A - B)	20,40,000



Dividend Decisions

MAY – 2023 – 5 Marks

Following information are given for a company:

Earnings per share	₹ 10
PE Ratio	12.5
Rate of return on investment	12%
Market price per share as per Walter's Model	₹ 130

You are required to calculate:

- Dividend payout ratio
- Market price of share at optimum dividend payout ratio
- PE Ratio at which the dividend policy will have no effect on the price of share
- Market price of share at this PE ratio
- Market price of share using Dividend growth model

Solution

(a) Cost of equity = $K_e = \frac{1}{PE\ Ratio} = \frac{1}{12.5} = 0.08 = 8\%$

Rate of return on investment = $r = 12\%$

As per Walter model,

$$P_0 = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{K_e}$$

$$130 = \frac{D + \left(\frac{0.12}{0.08}\right)(10 - D)}{0.08}$$

$$10.40 = D + 15 - (1.5)(D)$$

$$D = 9.20$$

$$\text{Thus, dividend payout ratio} = \frac{D}{EPS} \times 100 = \frac{9.20}{10} \times 100 = 92\%$$

- (b) Since, return (12%) is more than cost of equity (8%), thus optimal dividend payout ratio should be zero as per Walter model.

$$\text{Price at optimum dividend ratio} = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{K_e} = \frac{0 + \left(\frac{0.12}{0.08}\right)(10 - 0)}{0.08} = ₹ 187.50$$

- (c) When K_e is equal to rate of return then dividend will have no effect on value of share.

$$\text{Thus, } r = K_e = 12\%$$

$$PE\ ratio = \frac{1}{K_e} = \frac{1}{0.12} = 8.33\ \text{times}$$

(d) Market price = $\frac{D + \left(\frac{r}{K_e}\right)(E - D)}{K_e} = \frac{9.20 + \left(\frac{0.12}{0.12}\right)(10 - 9.20)}{0.12} = ₹ 83.33$

(e) $K_e = 8\%$ $r = 12\%$ $D_0 = 9.20$ $b = 0.08$

$$g = (b)(r) = (0.08)(0.12) = 0.0096$$

$$P = \frac{D_1}{K_e - g} = \frac{9.20(1 + 0.0096)}{(0.12 - 0.0096)} = ₹ 131.936$$

DECEMBER – 2021 – 5 Marks

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

- Find out intrinsic value per share.
- State whether shares are overpriced or underpriced.

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

Solution

Year	Particulars	Amount	PVF @ 16%	Present Value
1	Dividend	$140 \times (1+0.12) = 156.80$	0.847	132.81
2	Dividend	$156.8 \times (1+0.12) = 175.62$	0.718	126.10
3	Dividend	$175.62 \times (1+0.12) = 196.69$	0.608	119.59
4	Dividend	$196.69 \div (1+0.12) = 220.29$	0.515	113.45
			Total	491.95

Price at end of 4th year, $P_4 = \frac{D_5}{K_e - g} = \frac{220.29(1+0.05)}{0.18-0.05} = ₹ 1,779.27$

Intrinsic value of equity share = ₹ 491.95 + (₹ 1,779.26 × 0.515) = ₹ 1,408.27

Intrinsic value (₹ 1,408.27) is higher as compared to market price (₹ 2,185), thus, the share is overpriced by ₹ 776.73.

JULY – 2021 – 10 Marks

The following information relates to LMN Ltd.

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

Required:

- Determine what would be the market value per share as per Walter's model.
- Compute optimum dividend pay-out ratio according to Walter's model and the market value of company's share at that pay-out ratio.

Solution

- As per Walter Model, $P = \frac{D+(E-D)(r+K_e)}{K_e}$

Where,

P = Market price per share

E = Earnings per share = ₹ 30,00,000 ÷ 5,00,000 = ₹ 6

D = Dividend per share = ₹ 6 ÷ 60% = ₹ 3.60

r = Return earned on investment = 15% = 0.15

K_e = Cost of equity capital = 13% = 0.13

$$\therefore P = \frac{3.60 + (6 - 3.6)(0.15 \div 0.13)}{0.13} = ₹ 49$$

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

$$\text{Price at nil pay-out ratio} = \frac{0 + (6 - 0)(0.15 \div 0.13)}{0.13} = ₹ 53.25$$

JAN – 2021 – 5 Marks

The following information is taken from ABC Ltd.

Net profit for the year	₹ 30,00,000
12% Preference share capital	₹ 1,00,00,000
Equity share capital (Share of ₹ 10 each)	₹ 60,00,000
Internal rate of return on investment	22%
Cost of equity capital	18%
Retention ratio	75%

Calculate the market price of the share using:

- (1) Gordon's Model
- (2) Walter's Model

Solution

$$\begin{aligned} \text{Earning available for equity} &= \text{Net Profit} - \text{Preference Dividend} \\ &= 30,00,000 - (1,00,00,000 \times 12\%) = ₹ 18,00,000 \end{aligned}$$

$$\text{Earnings per share} = \frac{\text{Earning available for Equity}}{\text{No. of Equity Shares}} = \frac{18,00,000}{(60,00,000 \div 10)} = ₹ 3$$

$$\text{Dividend payout ratio} = 100 - 75\% = 25\%$$

$$\text{Dividend per share} = \text{EPS} \times \text{Dividend payout ratio} = 3 \times 25\% = ₹ 0.75$$

$$\text{Rate of return (r)} = 22\% = 0.22$$

$$\text{Cost of equity (K}_e\text{)} = 18\% = 0.18$$

$$(1) \text{ As per Gordon's Formula, } P = \frac{E(1-b)}{K_e - (b \times r)} = \frac{3 \times (1 - 0.75)}{0.18 - (0.75 \times 0.22)} = \frac{0.75}{0.015} = ₹ 50$$

$$(2) \text{ As per Walter Model, } P = \frac{D + (E - D)(r \div K_e)}{K_e} = \frac{0.75 + (3 - 0.75)(0.22 \div 0.18)}{0.18} = ₹ 19.44$$

NOV – 2020 – 5 Marks

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

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

You are required to compute the approximate dividend pay-out ratio by keeping the share price at ₹ 40 by using Walter's Model.

Solution

Earning available for equity = Net Profit – Preference Dividend
 = 50 lakhs – (200 lakhs × 13%) = ₹ 24 Lakhs

Earnings per share = $\frac{\text{Earning available for Equity}}{\text{No. of Equity Shares}} = \frac{24,00,000}{6,00,000} = ₹ 4$

As per Walter Model, $P = \frac{D+(E-D)(r+Ke)}{Ke}$

Where,

P = Market price per share = ₹ 40

E = Earnings per share = ₹ 4

D = Dividend per share

r = Return earned on investment = 25% = 0.25

Ke = Cost of equity capital = 15% = 0.15

$$\therefore P = \frac{D+(4-D)(0.25+0.15)}{0.15}$$

$$40 = \frac{D+(4-D)(1.6667)}{0.15}$$

$$6 = D + 6.667 - (1.667)D$$

$$0.667D = 0.6667$$

$$D = ₹ 1$$

Required dividend pay-out ratio = $\frac{\text{Dividend per share}}{\text{Earning per share}} \times 100 = \frac{1}{4} \times 100 = 25\%$

NOV – 2019 – 5 Marks

Following figures and information were extracted from the company A Ltd.

Earnings of the company	₹ 10,00,000
Dividend paid	₹ 6,00,000
No. of shares outstanding	2,00,000
Price Earnings Ratio	10
Rate of return on investment	20%

You are required to calculate:

- Current market price of the share
- Capitalization rate of its risk class
- What should be the optimum pay-out ratio
- What should be the market price per share at optimal pay-out ratio? (Use Walter's Model)

Solution

(a) As per Walter Model, $P = \frac{D+(E-D)(r+Ke)}{Ke}$

Where,

P = Market price per share

E = Earnings per share = ₹ 10,00,000 ÷ 2,00,000 = ₹ 5

D = Dividend per share = ₹ 6,00,000 ÷ 2,00,000 = ₹ 3

r = Return earned on investment = 20% = 0.20

Ke = Cost of equity capital = $\frac{1}{PE \text{ Ratio}} = \frac{1}{10} = 0.10$

$$\therefore P = \frac{3+(5-3)(0.20+0.10)}{0.10} = \frac{7}{0.10} = ₹ 70$$

- (b) Capitalization rate of risk class = $K_e = 10\%$
- (c) According to Walter's model when the return on investment (20%) is more than the cost of equity capital (10%), the price per share increases as the dividend pay-out ratio decreases. Hence, the optimum dividend pay-out ratio in this case is zero.
- (d) At a zero payout ratio, market price per share = $\frac{0+(5-0)(0.20 \times 0.10)}{0.10} = \frac{10}{0.10} = ₹ 100$

MAY – 2019 – 5 Marks

The following information is supplied to you:

Total Earning	₹ 40 lakhs
No. of equity shares (of ₹ 100 each)	4,00,000
Dividend per share	₹ 4
Cost of capital	16%
Internal rate of return on investment	20%
Retention ratio	60%

Calculate the market price of a share of a company by using:

- (a) Walter's Formula
(b) Gordon's Formula

Solution

$$\text{Earning per share (E)} = \frac{40 \text{ lakhs}}{4,00,000} = ₹ 10$$

- (a) As per Walter's Formula, $P = \frac{D+(E-D)(r+K_e)}{K_e} = \frac{4+(10-4)(0.20+0.16)}{0.16} = \frac{11.5}{0.16} = ₹ 71.88$
- (b) As per Gordon's Formula, $P = \frac{E(1-b)}{K_e-(b \times r)} = \frac{10(1-0.60)}{0.16-(0.60 \times 0.20)} = \frac{4}{0.04} = ₹ 100$

NOV – 2018 – 5 Marks

Following information relating to Jee Ltd. are given:

Particulars

Profit after tax	₹ 10,00,000
Dividend payout ratio	50%
Number of equity shares	50,000
Cost of equity	10%
Rate of return on investment	12%

- (a) What would be the market value per share as per Walter's Model?
(b) What is the optimum dividend payout ratio according to Walter's Model and Market value of equity share at that payout ratio?

Solution

- (a) As per Walter Model, $P = \frac{D+(E-D)(r+K_e)}{K_e}$

Where,

P = Market price per share



E = Earnings per share = ₹ 10,00,000 ÷ 50,000 = ₹ 20

D = Dividend per share = 50% × 20 = ₹ 10

r = Return earned on investment = 12% = 0.12

Ke = Cost of equity capital = 10% = 0.10

$$\therefore P = \frac{10 + (20 - 10)(0.12 + 0.10)}{0.10} = \frac{22}{0.10} = ₹ 220$$

- (b) 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 payout ratio of zero, the market value of the company's share will be:

$$P = \frac{0 + (20 - 0)(0.12 + 0.10)}{0.10} = \frac{24}{0.10} = ₹ 240$$

