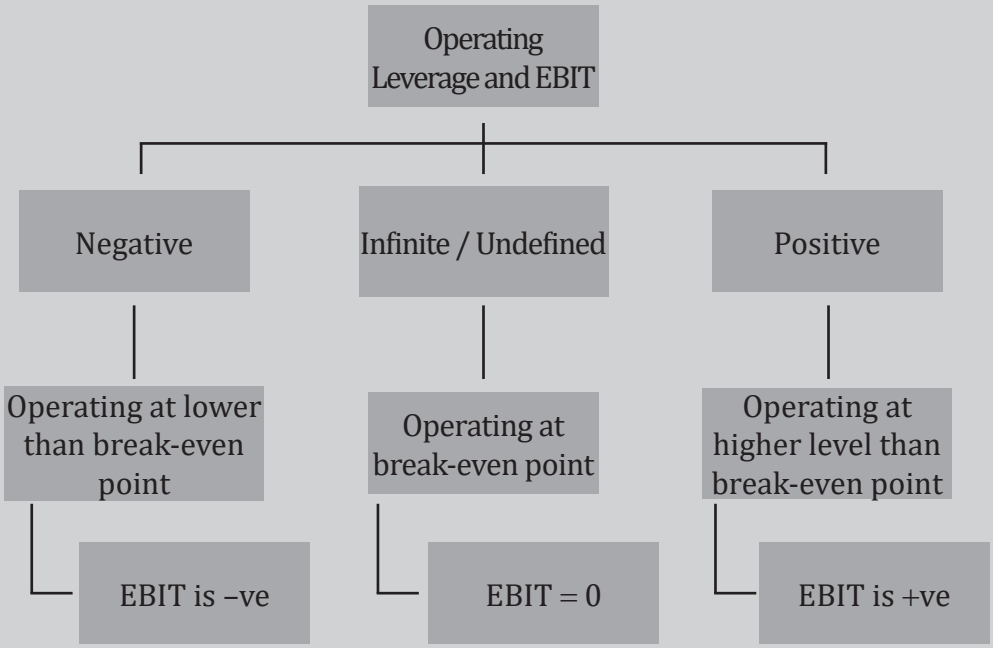
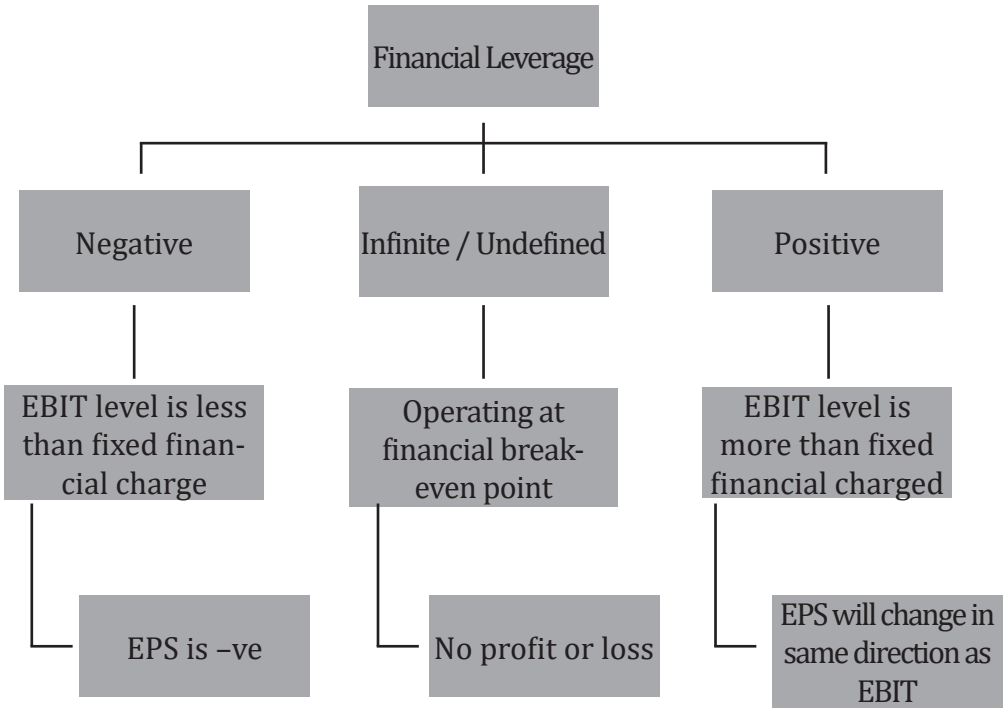
6 CHAPTER

Leverages

THEORY

Meaning of Leverage	❑ In financial analysis, leverage represents the influence of one financial variable over some other related financial variable. ❑ These financial variables may be costs, output, sales revenue, Earnings Before Interest and Tax (EBIT), Earning per share (EPS) etc.
Business Risk	❑ It refers to the risk associated with the firm's operations. This risk arises due to presence of fixed cost in the total cost. ❑ It is generally an unavoidable risk because a firm can't operate without incurring any fixed cost.
Financial Risk	❑ It refers to the risk associated with the firm's financing. This risk arises due to presence of interest and preference dividend. ❑ This risk can be avoided, if all the funds are raised from equity capital.
Operating Leverage	❑ It can be defined as the firm's ability to use fixed operating costs to magnify the effects of changes in sales on its earnings before interest and taxes. ❑ Degree of operating leverage (DOL) is equal to the percentage increase in the net operating income to the percentage increase in the output. ❑ $\text{DOL} = \frac{\text{Contribution}}{\text{EBIT}}$ $\text{DOL} = \frac{\%\text{ Change in EBIT}}{\%\text{ Change in Sales}}$
Operating Break-even point	❑ It is the level of sale at which operating profit i.e. EBIT is zero. ❑ Operating $\text{BEP (Units)} = \frac{\text{EBIT}}{\text{EBT}} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}}$ ❑ Operating *BEP* (₹) $= \frac{\text{Fixed Cost}}{\text{P / V Ratio}}$
Margin of safety (MOS) and Operating Leverage	❑ $\text{Dol} = \frac{1}{\text{Margin of safety}}$

Relationship between MOS, Business risk and DOL	❑ IF MOS rises, business risk falls and thereby DOL also falls ❑ If MOS falls, business risk rises and thereby DOL also rises.
Operating Leverage and EBIT	
Interpretation of DOL	❑ If a firm has no fixed cost then it indicates no operating leverage. ❑ A firm with high operating leverage (i.e. high fixed cost) indicates it has higher break-even point ❑ A firm with low operating leverage (i.e. low fixed cost) indicates it has lower break-even point ❑ A positive DOL means that firm is operating at higher level than break-even and both sales and EBIT moves in the same direction. ❑ In case of negative DOL, firm operates at a level lower than operating break-even and EBIT is negative. ❑ DOL can never be between zero and one. It can be zero or less or it can be one or more.
Financial Leverage	❑ It can be defined as the potential use of fixed finance costs (i.e. interest and preference dividend) to magnify the effect of changes in the earnings before interest and taxes on the earning per share of the firm. ❑ Degree of financial leverage (DFL) is equal to percentage increase in the earning per share to the percentage increase in the net operating income. ❑ $DFL = \frac{EBIT}{EBT}$ $DFL = \frac{\%\ Changes\ in\ EPS}{\%\ Change\ in\ EBIT}$ ❑ *DFL* with Preference Dividend = $\frac{EBIT}{EBT - \frac{Preference\ Dividend}{(1-t)}}$

Financial Break-even point	❑ It is the level of EBIT at which EPS of the firm is zero. ❑ Financial *BEP* (₹) = Interest + $\frac{\text{EBIT}}{\text{EBT}} = \frac{\text{Preference Dividend}}{(1-t)}$
Relationship between DFL and Financial Break-even point	❑ A positive DFL means that firm is operating at higher level than financial break-even and both EBIT and EPS moves in the same direction. In case of negative DFL, firm operates at lower than the financial break-even and EPS is negative.
Financial Leverage with EPS	
Interpretation of Financial Leverage	❑ No fixed financial cost indicates no financial leverage ❑ Higher fixed financial cost indicates high financial leverage ❑ When EBIT is higher than financial break-even point then it indicates positive financial leverage i.e. EPS is positive ❑ When EBIT is lower than financial break-even point then it indicates negative financial leverage i.e. EPS is negative ❑ DFL can never be between zero and one. It can be zero or less or it can be one or more.
Trading on equity	❑ It is the process of using securities with fixed financial burden (e.g. loan, preference shares, bonds etc.) to produce gain for the owners (equity shareholders). ❑ It is known as trading on equity because equity shareholders are the only one interested in the business income and lenders are willing to advance funds on the strength of the equity supplied by the owners. ❑ Trading on equity occurs if the firm takes debt to acquire assets on which it can earn return greater than the interest on cost of debt. In this case, the leverage is favourable for the firm.

Financial leverage as a double edge sword	❑ When return on investment (ROI) is more than fixed cost of fund (Interest) then financial leverage will help to increase return on equity and EPS. ❑ When return on investment (ROI) is less than fixed cost of fund (Interest) then financial leverage will affect return on equity and EPS unfavourably. ❑ Thus, financial leverage is also known as double edged sword.
Combined Leverage	❑ It may be defined as the potential use of fixed costs, both operating and financial, which magnifies the effect of sales volume change on the earning per share of the firm. ❑ Degree of combined leverage (DCL) is the ratio of percentage change in earning per share to the percentage change in sales. It indicates the effect the sales changes will have on EPS. ❑ $DCL = \frac{\text{Contribution}}{\text{EBT}}$ $DCL = \frac{\%\text{ Change in EPS}}{\%\text{ Change in Sales}}$ ❑ DCL = DOL × DFL ❑ DCL with Preference Dividend = $\frac{\text{Contribution}}{\text{EBT} - \frac{\text{Preference Dividend}}{(1-t)}}$
Overall Break-even point	❑ It is the level of sale at which EPS of the firm is zero. ❑ Overall *BEP* (Units) $= \frac{\text{EBIT}}{\text{EBT}} \frac{\text{Fixed Cost + Interest} + \frac{\text{Preference Dividend}}{(1-t)}}{\text{Contribution per unit}}$ ❑ Overall BEP (₹) = $\frac{\text{EBIT}}{\text{EBT}} \frac{\text{Fixed Cost + Interest} + \frac{\text{Preference Dividend}}{(1-t)}}{\text{P / V Ratio}}$

PRACTICAL QUESTIONS

1. Calculate the operating leverage for each of the four firms *A*, *B*, *C* and *D* from the following price and cost data, assuming number of units to be 5,000:

	Firms			
	A (₹)	**B (₹)**	**C (₹)**	**D (₹)**
Sale price per unit	20	32	50	70
Variable cost per unit	6	16	20	50
Fixed operating cost	60,000	40,000	1,00,000	NIL

[**Sol**. 7; 2; 3; 1]

2. Annual sales of a company are ₹60,00,000. Sales to variable cost ratio is 150% and fixed cost other than interest is ₹5,00,000 per annum. Company has 11% debentures of ₹30,00,000. You are required to calculate the operating, financial and combined leverage of the company.

[**Sol**. DOL = 1.333; DFL = 1.282; DCL = 1.709]

3. A company produces and sells 10,000 shirts. The selling price per shirt is ₹500. Variable cost is ₹200 per shirt and fixed operating cost is ₹25,00,000.

(*a*) Calculate operating leverage

(*b*) If sales are up by 10%, then compute the impact on EBIT?

[**Sol**. (*a*) 6; (*b*) increase by 60%]

4. A firm's details are as under:

Sales (@100 per unit)	₹24,00,000
Variable cost	50%
Fixed cost	₹10,00,000

It has borrowed ₹10,00,000 @ 10% p.a. and its equity share capital is ₹10,00,000 (₹100 each). Consider tax @ 50%. Calculate:

(*a*) Operating leverage (*b*) Financial leverage

(*c*) Combined leverage (*d*) Return on investment

(*e*) If the sales increase by ₹6,00,000; what will be new *EBIT*?

[**Sol**. (*a*) 6; (*b*) 2; (*c*) 12; (*d*) 10%; (*e*) ₹5,00,000]

5. The following figures are available for SK & Co.

Net sales	₹15 crores
EBIT as % of Net Sales	12%

Capital employed: (*a*) Equity ₹5 crores; (*b*) Preference shares of ₹1 crores bearing 13% rate of dividend; (*c*) Debt @ 15% ₹3 crores.

Given that its combined leverage = 3 and the income tax rate applicable is 40%. You are required to calculate;

(*a*) The Return on Equity of the company; and (*b*) the Financial Leverage of the company and (*c*) the operating leverage of the company.

[**Sol**. (*a*) 13.60%; (*b*) 1.588; (*c*) 1.889]

6. SK Co. has three financial plans before it, plan I, plan II and plan III. Calculate operating and financial leverage for the firm on the basis of the following information and also find out the highest and lowest value of combined leverage.

Production	800 units
Selling price per unit	₹15
Variable cost per unit	₹10
Fixed cost Situation A	₹1,000
Situation B	₹2,000
Situation C	₹3,000

Capital Structure	Plan I	Plan II	Plan III
Equity Capital	₹5,000	₹7,500	₹2,500
12% Debt	₹5,000	₹2,500	₹7,500

[**Sol**. DOL = 1.33; 2; 4; DFL = Plan – I - 1.25; 1.43; 2.5; Plan – II - 1.11; 1.18; 1.43; Plan – III - 1.43; 1.82; 10; DCL = Plan – I – 1.66; 2.86; 10; Plan – II – 1.48; 2.36; 5.72; Plan – III – 1.90; 3.64; 40]

7. From the following financial data for Company S and Company K; prepare their Income Statements.

	Company S	Company K
Variable cost	56,000	60% of sales
Fixed cost	20,000	–
Interest Expenses	12,000	9,000
Financial Leverage	5: 1	–
Operating Leverage	–	4: 1
Income tax rate	30%	30%
Sales	–	1,05,000

[**Sol**. EAT - Company S = ₹2,100; Company K = ₹1,050

8. The following information is related to SK Ltd. for the year ended 31st March, 2021

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

You are required to calculate:

(*a*) Operating leverage

(*b*) Combined leverage and

(*c*) Earning per share

[**Sol**. (*a*) 1.43; (*b*) 2.13; (*c*) 1.30]

9. 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:

(*a*) Prepare the profit-loss statement of SS Ltd. and

(*b*) Find out the number of equity shares

[**Sol**. (*a*) *EAT* = ₹14,000; (*b*) 10,000 shares]

10. 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.

[**Sol**. ₹28]

11. 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%.

[**Sol**. (i) 1.25; 5; (ii) 25%]

12. A Company had the following Balance Sheet as on March 31, 2019?

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

The additional information given is as under:

Fixed costs per annum (excluding interest)	:	₹4 crores
Variable operating costs ratio	:	65%
Total Assets turnover ratio	:	2.5
Income-Tax Rate	:	30%

Required: Calculate the following and comment:

(*a*) Earnings per share (*b*) Operating Leverage

(*c*) Financial Leverage (*d*) Combined Leverage

[**Sol**. (*a*) ₹16.80; (*b*) 1.296; (*c*) 1.125; (*d*) 1.458]

13. A firm has sales of ₹75,00,000, variable cost is 56% and fixed cost of ₹6,00,000. It has a debt of ₹45,00,000 at 9% and equity of ₹55,00,000.

(*a*) What is the firm's ROI?

(*b*) Does it have favourable financial leverage?

(*c*) If the firm belongs to an industry whose capital turnover is 3, does it have a high or low capital turnover?

(*d*) What are the operating, financial and combined leverage of the firm?

(*e*) If the sales is increased by 10% by what percentage *EBIT* will increase?

(*f*) At what level of sales the *EBT* of the firm will be equal to zero?

(*g*) If *EBIT* increases by 20%, by what percentage *EBT* will increase?

[**Sol**. (*a*) 27%; (*b*) Yes; (*c*) Low; (*d*) 1.22; 1.176; 1.438; (*e*) 12.20%; (*f*) ₹22,84,091; (*g*) 23.52%]

14. Use the following data and solve the problem:

Total sales	1,50,000 units
Selling price	₹25 p.u.
Fixed cost	₹2,80,000
Variable cost	₹20
Debt	₹10,00,000 @ 11% interest rate
Equity	₹20,00,000
Face value of each share	₹10
Tax rate	45%

(*a*) How much the company's sale has to come down so that the earnings before taxes is equal to zero?

(*b*) If EBIT doubles, what will be the new level of EBT?

(*c*) What are the operating and combined leverages?

(*d*) If the assets turnover of the industry is 0.75, does the firm have a high or low degree of asset turnover?

[**Sol**. (*a*) 72,000 units; (*b*) ₹8,30,000; (*c*) 1.596; 2.083; (*d*) high]

PRACTICE QUESTIONS

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

Name of the Firm	Change in Revenue	Change in Operating Income	Change in Earning per Share
A	28%	26%	32%
B	27%	34%	26%
C	25%	38%	23%
D	23%	43%	27%
E	25%	40%	28%

You are required to calculate for all firms:

(*a*) Degree of operating leverage (*b*) Degree of combined leverage

[**Sol**. (*a*) 0.929; 1.259; 1.520; 1.870; 1.60; (*b*) 1.143; 0.963; 0.920; 1.174; 1.120]

16. From the following information extracted from the books of accounts of SK Ltd., calculate percentage change in earning per share, if sales increase by 10% and fixed operating costs is ₹1,57,500.

Particulars	Amount in (₹)
EBIT (Earnings before interest and tax)	31,50,000
Earnings before tax (EBT)	14,00,000

[**Sol**. 23.625%]

17. The capital structure of SK Ltd. for the year ended 31st March, 2021 consisted as follows:

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

During the year 2020-21, sales decreased to 1,00,000 units as compared to 1,20,000 units in the previous year. However, the selling price stood at ₹12 per unit and variable cost at ₹8 per unit for both the years. The fixed expenses were at ₹2,00,000 p.a. and the income tax rate is 30%.

You are required to calculate the following:

(*a*) The degree of operating leverage at 1,20,000 units and 1,00,000 units

(*b*) The degree of financial leverage at 1,20,000 units and 1,00,000 units

(*c*) The percentage change in *EPS*

[**Sol**. (*a*) 1.71; 2; (*b*) 1.56; 2; (*c*) 44.44%]

18. SK Ltd. has the following balance sheet and income statement information:

Balance Sheet as on March 31st 2021

Liabilities	₹	Assets	₹
Equity Share Capital (₹10 per share)	8,00,000	Net Fixed Assets	10,00,000
		Current Assets	9,00,000
10% Debt	6,00,000		
Retained Earnings	3,50,000		
Current Liabilities	1,50,000		
	19,00,000		19,00,000

Income Statement for the year ending March 31st 2021

Particulars	₹
Sales	3,40,000
Operating expenses (including ₹60,000 depreciation)	1,20,000
EBIT	2,20,000
Less: Interest	60,000
Earning before tax	1,60,000
Less: Taxes	56,000
Net Earning (EAT)	1,04,000

(*a*) Determine the degree of operating, financial and combined leverages at the current sales level, if all operating expenses, other than depreciation, are variable costs.

(*b*) If total assets remain at the same level, but sales (*i*) increase by 20% and (ii) decrease by 20%, compute the earnings per share at the new sales level?

[**Sol**. (*a*) DOL = 1.27; DFL = 1.38; DCL = 1.75]

19. Following information has been extracted from the accounts of newly incorporated Textyl Pvt. Ltd. for the financial year 2020-21:

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

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

(i) The percentage change in taxable income if sales increase by 15%.

(ii) The percentage change in EBIT if sales decrease by 10%.

(iii) The percentage change in taxable income if EBIT increase by 15%.

[**Sol**. (i) 26.25%; (ii) 14%; (iii) 18,.75%]

20. Calculate the operating leverage, financial leverage and combined leverage from the following data under Situation I and II and financial Plan *A* and *B*:

Installed capacity	4,000 units
Actual production and sales	75% of the capacity
Selling price	₹30 per unit
Variable cost	₹15 per unit
Fixed Cost:	
Under Situation-I	₹15,000
Under situation-II	₹20,000

Capital Structure:

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

[**Sol**. DOL = 1.5; 1.8; DFL = Situation – I – 1.07; 1.034; Situation – II – 1.09; 1.04; DCL – Situation – I – 1.61; 1.55; Situation – II – 1.96; 1.872

21. Following are the selected financial information of *A* Ltd. and *B* Ltd. for the year ended March 31st, 2021:

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

You are required to find out:

(*a*) EBIT

(*b*) Sales

(*c*) Fixed Cost

(*d*) Identify the company which is better placed with reasons based on leverages

[**Sol**. (*a*) ₹30,000; ₹2,00,000; (*b*) ₹3,75,000; ₹8,00,000; (*c*) ₹1,20,000; ₹2,00,000; (*d*) Company B]

22. Consider the following information for SK Ltd:

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

Required to compute its earning after tax.

[**Sol**. ₹10,938]

23. From the following information, prepare Income Statement of company *A* & *B*:

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

[**Sol**. EAT = ₹550; ₹550]

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

Sales - ₹100 lakhs

Interest payable per annum - ₹10 lakhs

Operating leverage 1.2

Combined leverage – 2.16

You are required to calculate:

(*a*) The financial leverage (*b*) Fixed cost (*c*) PV Ratio

[**Sol**. (*a*) 1.80; (*b*) ₹4,50,000; (*c*) 27%]

25. The sales revenue of SK Ltd. @₹20 per unit of output is ₹20 lakhs and contribution is ₹10 lakhs. At the present level of output, the *DOL* of the company is 2.5. the company does not have any Preference Shares. The number of Equity Shares are 1 lakh. Applicable corporate income tax rate is 50% and the rate of interest on Debt Capital is 16% p.a. Calculate the Eps (at sales revenue of ₹20 lakhs) and amount of debt capital of the company if a 25% decline in Sales will wipe out *EPS*.

[**Sol**. *EPS* = ₹1.25; Debt amount = ₹9,37,500]

26. 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.

[**Sol**. (1) (*a*) 1.263; (*b*) 1.033; (*c*) 1.304; (2**)** (*a*) ₹49,714; (*b*) ₹75,429; (*c*) ₹24,000]

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

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

Required:

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

[**Sol**. (i) 15.46%; (ii) favourable; (iii) 1.498; 2.062; (iv) 14.98%; (v) ₹44,28,571]

28. The following details of a company for the year ended 31st March, 2021 are given below:

Operating leverage	2:1
Combined leverage	2.5:1
Fixed cost excluding interest	₹3.4 lakhs
Sales	₹50 lakhs
8% Debentures of ₹100 each	₹30.25 lakhs
Equity share capital of ₹10 each	34 lakhs
Income tax rate	30%

Calculate:

(*a*) Financial leverage

(*b*) PV Ratio and Earning per Share (*EPS*)

(*c*) If the company belongs to an industry, whose assets turnover is 1.5, does it have a high or low assets turnover?

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

[**Sol**. (*a*) 1.25; (*b*) 13.6%; ₹0.202; (*c*) low; (*d*) ₹42,79,412]

SOLUTIONS

15. Statement of degree of combined leverage and degree of financial leverage

Firm	(a) $DCL = \frac{\%\text{ change in operating income}}{\%\text{ change in revenue}}$	(b) $DFL = \frac{\%\text{ change in EPS}}{\%\text{ change in revenue}}$
M	$\frac{26\%}{28\%} = 0.929$	$\frac{32\%}{28\%} = 0.963$
N	$\frac{34\%}{27\%} = 1.259$	$\frac{26\%}{27\%} = 0.963$
P	$\frac{38\%}{25\%} = 1.520$	$\frac{27\%}{23\%} = 1.174$
Q	$\frac{43\%}{23\%} = 1.870$	$\frac{27\%}{23\%} = 1.174$
R	$\frac{40\%}{25\%} = 1.60$	$\frac{28\%}{25\%} = 1.120$

16. Operating Leverage (*OL*) $\frac{\text{Contribution}}{EBIT} = \frac{EBIT + \text{Fixed Cost}}{EBIT} = \frac{₹\,31,50,000 + ₹\,1,57,500}{31,50,000} = 1.05$

Financial Leverage (FL) $= \dfrac{EBIT}{EBT} = \dfrac{₹\,31,50,000}{₹\,14,00,000} = 2.25$

Combined Leverage (CL) = 1.025 × 2.25 = 2.3625

Percentage Change in Earnings per share

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

$\therefore$ % change in EPS = 23.625%

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

17. **Income Statement with required calculations**

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

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

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

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

DCL = DOL × DFL = 1.27 × 1.38 = 1.75.

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

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

Working Notes:

(i) Variable Costs =₹60,000 (total cost - depreciation**)**

(ii) Variable Costs at:

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

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

19. Workings:

(*a*) Operating leverage $= \frac{\text{Contribution}}{\text{EBIT}}$

$$1.4 = \frac{15,00,00 \times 70\%}{\text{EBIT}}$$

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

$$1.25 = \frac{7,50,000}{\text{EBT}}$$

EBT = ₹60,00,000

(*c*) Income Statement

Particulars	Amount (₹)
Sales	15,00,000
Less: Variable cost (15,00,000 × 30%)	4,50,000
Contribution (15,00,000 × 70%)	10,50,000
Less: Fixed cost (Bal. fig.)	3,00,000
EBIT [working (a)]	7,50,000
Less: Interest (Bal. fig.)	1,50,000
EBT [working (b)]	6,00,000

Combined leverage = DOL × DFL = 1.4 × 1.25 = 1.75 times

(i) If sales increased by 15% than taxable income will be increased by 1.75 × 15% = 26.25%.

Verification:

Particulars	Amount (₹)
Sales (15,00,000 + 15%)	17,25,000
Less: Variable cost (17,25,000 × 30%)	5,17,500
Contribution (17,25,000 × 70%)	12,07,500
Less: Fixed cost	3,00,000
EBIT	9,07,500
Less: Interest	1,50,000
EBT	7,57,500

Percentage change in EBT $= \frac{(7,57,500 - 6,00,000)}{(6,00,000)} \times 100 = 26.25\%$

(ii) If sales decreased by 10% than EBIT will be decreased by 1.40 × 10% = 14%

Verification:

Particulars	Amount (₹)
Sales (15,00,000 – 10%)	13,50,000
Less: Variable cost (13,50,000 × 30%)	4,05,000
Contribution (13,50,000 × 70%)	9,45,000
Less: Fixed cost	3,00,000
EBIT	6,45,000

Percentage change in $EBIT = \frac{(7,50,000 - 6,45,000)}{(7,50,000)} \times 100 = 14\%$

(iii) If EBIT increased by 15% than taxable income will be increased by 1.25 × 15% = 18.75%

Verification:

Particulars	Amount (₹)
EBIT (7,50,000 + 15%)	8,62,500
Less: Interest	1,50,000
EBT	7,12,500

Percentage change in $EBT = \frac{(7,12,500 - 6,00,000)}{(6,00,000)} \times 100 = 18.75\%$.

20. (i) Operating Leverage (*OL*)

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

(ii) Financial Leverage (*FL*)

Particulars	Situation – I		Situation – II	
	A (₹)	B (₹)	A (₹)	B (₹)
EBIT	30,000	30,000	25,000	25,000
(-) Interest on debt	2,000	1,000	2,000	1,000
EBT	28,000	29,000	23,000	24,000
$DFL = \frac{EBIT}{EBT}$	$\frac{30,000}{28,000} = 1.07$	$\frac{30,000}{29,000} = 1.034$	$\frac{25,000}{23,000} = 1.09$	$\frac{25,000}{24,000} = 1.04$

(iii) Combined Leverage (*CL*)

Particulars	Situation – I		Situation – II	
	A (₹)	B (₹)	A (₹)	B (₹)
DOL	1.5	1.5	1.8	1.8
DFL	1.07	1.034	1.09	1.04
DCL = DOL × DFL	1.61	1.55	1.96	1.872

21. Company A

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

So, 3 $= \frac{EBIT}{EBIT - ₹20,000}$

or, 3 (EBIT – 20,000) = EBIT

or, 2 EBIT = 60,000

or, EBIT = 30,000

(*ii*) Operating Leverage $= \frac{Contribution}{EBIT}$ or, $5 = \frac{Contribution}{30,000}$

or, contribution = ₹1,50,000

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

Company B

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

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

Or, 2 (EBIT – ₹1,00,000) = *EBIT*

Or, 2 (EBIT – ₹2,00,000) = *EBIT*

Or, EBIT = ₹2,00,000

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

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

or, Contribution = ₹4,00,000

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

(*iii*) Fixed Cost = Contribution – *EBIT* = ₹4,00,000 – ₹2,00,000 = ₹2,00,000

Income Statements of Company A and Company B

	Company A (₹)	Company B (₹)
Sales	3,75,000	8,00,000
Less: Variable cost	2,25,000	4,00,000
Contribution	1,50,000	4,00,000
Less: Fixed Cost	1,20,000	2,00,000
Earnings before interest and tax (*EBI*T)	30,000	2,00,000
Less: Interest	20,000	1,00,000
Earnings before tax (*EB*T)	10,000	1,00,000
Less: Tax @ 30%	3,000	30,000
Earnings after tax (*EA*T)	7,000	70,000

Comment based on Leverage

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

- Capacity of Company B to meet interest liability is better than that of companies A (from EBIT/Interest
- $\left[A = \frac{₹\,30,000}{₹\,20,000} = 1.5, B = \frac{₹\,2,00,000}{₹\,1,00,000} = 2 \right]$
- Company B has the least financial risk as the total risk (business and financial) of company B is lower (combined leverage of Company A – 15 and Company B – 4).

22. Workings:

1. Operating Leverage $= \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{₹\,150 \times 2,500}{\text{EBIT}} = \frac{₹\,3,75,000}{\text{EBIT}} = 6$

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

2. Operating Leverage (*OL*)× Financial Leverage (*FL*)= Combined Leverage (*CL*)

   6× Financial Leverage = 24

   ∴ Financial Leverage = 4

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

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

   Computation of Earnings after tax

   Earnings after Tax(EAT) = EBT (1 – t) = ₹ 15,625(1 – 0.30) = ₹ 10,938.

23. **Income Statement**

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

Workings:

(*i*) Company A

Financial Leverage = EBIT/(EBIT – Interest)

4 = EBIT/(EBIT – ₹ 3,000)

4*EBIT* – ₹12,000 = EBIT

3*EBIT* = ₹12,000

EBIT = ₹4,000

Company B

Financial Leverage = EBIT/(EBIT – Interest)

3 = EBIT/(EBIT – ₹2,000)

3EBIT – ₹ 6000 = EBIT

2EBIT = ₹ 6,000

EBIT = ₹3,000

(*ii*) Company A

Operating Leverage = 1/ Margin of Safety =1/0.20=5

Operating Leverage = Contribution/EBIT

5 = Contribution/₹4,000

5 = Contribution/₹4,000

Company B

$$\text{Operating Leverage} = \frac{1}{\text{Margin of Safety}} = \frac{1}{0.25} = 4$$

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

$$4 = \frac{\text{Contribution}}{₹\,3{,}000} = \text{Contribution} = 12,000$$

(*iii*) Company A

Profit Volume Ratio = 25%(Given) Profit Volume Ratio = Contribution/Sales × 100 25%

= ₹ 20,000/Sales, Sales = ₹ 20,000/25% Sales = ₹ 80,000

Company *B*

Profit Volume Ratio = 33.33%

Therefore, Sales = 12,000/33.33%

Sales = ₹ 36,000.

24. (*a*) Combined leverage = Financial Leverage × Operating Leverage

2.16 = Financial Leverage × 1.2

Financial Leverage = 1.8

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

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

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

1.8(*EBIT* – 10,00,000) = *EBIT*

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

EBIT = ₹22,50,000

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

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

(1.2) *EBIT* = *EBIT* + Fixed Cost

1.2 × 22,50,000 = 22,50,000 + Fixed Cost

Fixed Cost = ₹4,50,000

(*c*) Contribution = *EBIT* + Fixed Cost = 22,50,000 + 4,50,000 = ₹27,00,000

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

25. (i) Calculation of Fixed Cost

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

EBIT = Contribution - Fixed Cost

₹ 4,00,000 = ₹10,00,000 – Fixed Cost

Fixed Cost = ₹10,00,000 – ₹4,00,000 = ₹6,00,000

(ii) Calculation of Degree of Combined Leverage (*DF*L)

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

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

(iii) Calculation of Degree of Financial Leverage (*DF*L)

DCL = DOL × DFL 4 = 2.5 × DFL So, DFL =1.6

(iv) Calculation of Interest and amount of Debt

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

Debt × Interest rate = Amount of Interest

Debt ×16% = ₹ 1,50,000

Debt =₹ 9,37,500

(v) Calculation of Earnings per share (*EPS*)

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

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

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

Sales = ₹24,00,000

Income Statement

Particulars	Amount (₹)
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)(*a*) Operating leverage = $\frac{\text{Contribution}}{EBIT} = \frac{9,60,000}{7,60,000} = 1.263$ times

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

(*c*) Combined Leverage = *OL* × *FL* = 1.263 × 1.033 = 1.304 times

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

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

EBIT = ₹49,714.

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

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

EBIT = ₹75,429

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

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

EBIT = ₹24,000.

27. **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

(*i*) Return on capital employed $= \dfrac{\text{EBIT}}{\text{Capital employed}} \times 100 = \dfrac{20{,}10{,}000}{1{,}30{,}00{,}000} \times 100 = 15.46\%$

Earning per share = EAE/No. of Equity Shares = 8,76,000/7,50,000 = ₹1.168

(*ii*) Since, the return on capital employed (15.46%) is more than the interest rate (10%), thus the company has a favourable financial leverage.

(*iii*) Operating leverage $= \frac{\text{Contribution}}{\text{EBIT}} = \frac{30,10,000}{20,10,000} = 1.498$ times

Combined leverage $= \frac{\text{Contribution}}{\text{EBIT}} = \frac{30,10,000}{14,60,000} = 2.062$ times

(*iv*) Operating leverage $= \frac{\%\text{ Change in EBIT}}{\%\text{ Change in Sales}}$

$1.498 = \frac{\%\text{ Change in EBT}}{+10}$

% Change in EBIT = +14.98

Thus, EBIT increases by 14.98%

(*v*) Required sales $= \frac{\text{Fixed cost + Interest}}{\text{PV Ratio}} = \frac{(10,00,000 + 5,50,000)}{35\%} =$ ₹ 44.28,571

28. (*i*) Financial leverage

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

2.5 = 2×FL

Or, FL = 1.25

Financial Leverage = 1.25

(*ii*) P/V Ratio and earning per share (*EPS*)

Operating leverage $= \frac{\text{Contribution (C)}}{\text{Contribution-Fixed Cost (FC)}} = 2 = \frac{C}{C - 3,40,000}$

Or, $C = 2(C - 3,40,000)$

Or, $C = 2(C - 6,80,000)$

Or, Contribution = ₹6,80,000

Now, P / V ratio $= \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 = \frac{6,80,000}{50,00,000} \times 100 = 13.6\%$

EBT = Sales – Variable Cost – Fixed Cost – Interest

= ₹ 50,00,000 – ₹ 50,00,000 (1 – 0.136**)** – ₹ 3,40,000 – (8% × ₹ 30,25,000)

= ₹ 50,00,000 – ₹ 43,20,000 – ₹ 3,40,000 – ₹ 2,42,000 = ₹ 98,000

PAT = *EBT* (1 – T) = ₹ 98,000 (1 – 0.3**)** = ₹ 68,600

$EPS = \frac{\text{Profit after tax}}{\text{No. of equity shares}} = \frac{₹\,68,600}{3,40,000 \text{ shares}} =$ ₹ 0.202

(*iii*) **Assets turnover**

$$\text{Assets turnover} = \frac{\text{Sales}}{\text{Total Assets*}} = \frac{₹\,50,00,000}{₹\,34,00,000 + ₹\,30,25,000} = 0.78$$

0.78 < 1.5 means lower than industry turnover.

*Total Asset = Equity share capital + 8% Debentures.

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

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

Alternatively

Required sales when EBT is zero =

$$\frac{\text{Fixed cost + Interest + desired Profit}}{\text{P / v ratio}} = \frac{₹\,3,40,000 + ₹\,2,42,000 + \text{zero}}{13.60\%}$$

$$= \frac{₹\,5,82,000}{13.60\%} = ₹\,42,79,412$$

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