CHAPTER 6

LEVERAGE

Concept #1 Income Statement

INCOME STATEMENT

Particulars	₹
Sales	xx
(-) Variable Costs	xx
Contribution	xx
(-) Fixed Costs	xx
EBIT	xx
(-) Interest	xx
EBT	xx
(-) Taxes	xx
PAT	xx
(-) PD	xx
PAFESH (A)	xx
No. of Eq. shares (B)	xx
Earnings per share (A/B)	xx

Concept #2 Degree of Operating Leverage (DOL)

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

$$DOL = \frac{\%\,\Delta\, EBIT}{\%\,\Delta\, Sales}$$

$$\%\,\Delta EBIT = \%\,\Delta\, Sales \times DOL$$

Concept #3 Degree of Financial Leverage (DFL)

$$DFL = \frac{EBIT}{EBT}$$

$$DFL = \frac{EBIT}{EBIT - Int - \frac{PD}{(1-t)}}$$

$$DFL = \frac{\%\Delta EPS}{\%\Delta EBIT}$$

$$\%\Delta EPS = \%\Delta EBIT \times DFL$$

Concept #4 Degree of Combined Leverage (DCL)

$$DCL = DOL \times DFL$$

$$DCL = \frac{Contribution}{EBT}$$

$$DCL = \frac{\%\Delta EPS}{\%\Delta Sales}$$

$$\%\Delta EPS = \%\Delta Sales \times DCL.$$

Concept #5 Financial Break-Even

$$EBIT = \frac{EPS \times No.\ of\ shares}{(1-t)} + Interest$$

Question #1 PTP D24

Ans: ***65K Units; 11,62,000; DOL -1.475, DFL – 1.23, DCL – 1.814***

Alpha Pharma Ltd., which has been engaged in business for the last five years, furnishes the following information for its only product Metmorphin Hydrochloride which is being sold at ₹ 23 per unit:
Total Sales: 1,45,000 units
Fixed Cost: ₹ 2,80,000
Variable Cost: ₹ 17 per unit
Debt Capital: ₹10,00,000 @ 11% interest rate
Equity Capital: ₹ 20,00,000
Face Value of each share of the company is ₹ 10.
Tax rate applicable is 30%.

(i) What is the number of units that should be sold so that the Earnings before Taxes (EBT) is equal to zero?
(ii) If Earnings before Interest & Taxes (EBIT) increase to three times the current EBIT, then what is the Earnings after Taxes (EAT)?
(iii) What will be the degree of operating, financial and combined leverage?

Question #2 **PTP D23/D19/J17** *Ans:* *1.38; 1.03; 1.43*

The balance sheet of a company for the year 2022-23 is given below (in ₹ Crore):

Liabilities	Amount (₹)	Assets	Amount (₹)
Equity shares capital (10)	1,20,000	Fixed Assets	3,00,000
Retained Earnings	40,000	Current Assets	1,00,000
10% Long term debt	1,60,000		
Current Liabilities	80,000		
	4,00,000		**4,00,000**

The company's total assets turnover ratio is 3, its fixed operating costs are ₹ 2,00,000 and its variable operating cost ratio is 40%. The income tax rate is 30%.

Calculate Degree of Operating leverage, Degree of Financial leverage and Degree of Combined leverage of the company.

Question #3 **PTP D23** *Ans:* *2.67 times, 1.15 times, 3.08 times; ₹ 108,308*

The Balance Sheet of TUPN Ltd. as on March 31' 2023 is as follows:

Liabilities	Amount (₹)	Assets	Amount (₹)
Equity Share Capital (₹10 each)	1,20,000	NET Fixed Assets	3,00,000
Other Equity	40,000	Current Assets	1,00,000
10% Long term Debt	1,60,000		
Current Liabilities	80,000		
	4,00,000		**4,00,000**

The Company's total assets turnover ratio is 2. Its fixed operating costs are ₹ 2,00,000 and the variable operating cost ratio 60 per cent. The Corporate Tax rate is 35 per cent.

Required:

(i) Analyze the Operating, Financial and Combined Leverages.

(ii) Assess the likely level of EBIT, if EPS is ₹ 5.

Question #4 **PTP D18** *Ans:* *1.25 times; 1.03 times; 1.29*

Jai & Karti Ltd. sells 1000,000 bottles of Soda in a year. Each bottle produced has a variable cost of ₹ 5 and sells for ₹ 10. Fixed operating costs are ₹ 10,00,000. The company has debt of ₹ 12,00,000 at 10% rate of interest.

As a Cost and Management Accountant you are required to calculate:

(i) The Degree of Operating Leverage,

(ii) The Degree of Financial Leverage, and

(iii) The Degree of Total Leverage.

Question #5 **PTP D17** *Ans:* *₹ 16K; ₹ 56K*

Company A reports the following information from its financial statements.

	₹
Sales	8,00,000
Less: Variable cost	2,40,000
Contribution	5,60,000
Fixed Cost	4,00,000
EBIT	1,60,000
Less: Interest	20,000
Profit before Tax	1,40,000

Find out:

(i) Using concept of financial leverage, by what percentage will the taxable income increase, if EBIT increases by 10%? Verify the results in terms of Rupees.

(ii) Using the concept of operating leverage, by what percentage will EBIT increase if there is 10% increase in sales? Verify the results in terms of Rupees.

Question #6 **MQP D24** *Ans:* *7;2;3;1*

Calculate the operating leverage for each of the four firms P, Q, R and S from the following price and cost data. Analyze the relationship between levels of fixed costs and the resulting degree of operating leverage? Assume number of units sold is 10,000.

Particulars	Firms			
	P	Q	R	S
Sales price per unit	₹20	₹32	₹50	₹70
Variables cost per unit	₹6	₹16	₹20	₹50
Fixed operating cost	₹1,60,000	₹80,000	₹4,00,000	Nil

Question #7 **MQP D24/ D23** *Ans:* *27%; yes; Low; 1.22, 1.18, 1.44; 16L; 22,84,091*

A firm's sales, variable costs and fixed cost amount to ₹75 lakhs, ₹42 lakhs and ₹6 lakhs respectively. It has borrowed ₹45 lakhs at 9% and its equity capital totals ₹55 lakhs.

Analyze the given information and calculate the following:

(i) The firm's ROI.

(ii) Does it have favourable financial leverage?

(iii) If the firm belongs to an industry whose asset turnover is 3, does it have high or low asset leverage?

(iv) The operating, financial and combined leverages of the firm.

(v) If the sales drop to ₹50 lakhs what will the new EBIT be?

(vi) At what level will the EBT of the firm equal to zero?

Question #8 **MQP J24** *Ans:* *15.1; 24.17, 6.03; 2 times;*

The operating income of Hypothetical Ltd amounts to ₹ 1,86,000. It pays 35% tax on its income. Its capital structure consists of the following:

	₹
14% Debentures	5,00,000
15% Preference shares	1,00,000
Equity shares (₹ 100 each)	4,00,000

Determine:

(i) the firm's EPS;

(ii) the percentage change in EPS associated with 30% change (both increase and decrease) in EBIT;

(iii) the degree of financial leverage at the current level of EBIT;

(iv) the additional data do you need to compute operating as well as combined leverage.

Question #9 **MQP D23** *Ans:* *DOL- 24k, 52,500, 8k DFL – 17k, 38,500,6,500 DCL –1.846, 1.72, 1.23*

Calculate the degree of operating leverage (DOL), degree of financial leverage (DFL) and the degree of combined leverage (DCL) for the following firms and interpret the results.

	Firm K	Firm L	Firm M
Output (Units)	60,000	15,000	1,00,000
Fixed costs (₹)	7,000	14,000	1,500
Variable cost per unit (₹)	0.20	1.50	0.02
Interest on borrowed funds (₹)	4,000	8,000	—
Selling price per unit (₹)	0.60	5.00	0.10

LEVERAGE

Q1

(i) Turnover of the firm = ₹ 23 x 145000 = ₹ 33,35,000

Total cost = ₹ 17 x 145000 + ₹ 280000 = ₹ 27,45,000

Earnings before Interest & Tax (EBIT) = ₹ (33,35000 – 27,45,000) = ₹ 5,90,000

Interest Charges = ₹ 10,00,000 x 0.11 = ₹ 1,10,000

If the EBT is equal to Zero, then EBIT should be equal to interest charges.

Let this happen at a sales level of X units.

Profit function (EBIT) = (SP – VC)X – FC

Then, (23 - 17) X - 2,80,000 = ₹ 1,10,000

or 6X = 3,90,000

or, X= 65,000 units

So, the number of units to be issued is 65,000 units.

(ii) If EBIT increases by three times, then the new level of EBIT would be equal to ₹ (3 x 5,90,000) = ₹ 17,70,000

New level of EBT = EBIT –I = ₹ 17,70,000- ₹ 1,10,000 = ₹ 16,60,000

EAT = 16,60,000 X (1 -0.3) = ₹ 11,62,000

(iii) Degree of operating leverage

$$= \frac{145000\,(23-17)}{145000\,(23-17)-280000} = 1.475$$

Degree of financial leverage is

$$= \frac{590000}{590000-110000} = 1.23$$

Combined leverage = 1.475 x 1.23 = 1.814

Q2

Income Statement	₹
Turnover (4,00,000 × 3)	12,00,000
less: Variable Cost @ 40%	(4,80,000)
Contribution	7,20,000
less: Fixed Op. cost	(2,00,000)
EBIT	5,20,000
less: Interest (160000 × 10%)	16,000
EBT.	5,04,000

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Degree of Operating leverage = $\frac{\text{Contn}}{\text{EBIT}} = \frac{72000}{52000} = 1.38$

Degree of financial leverage = $\frac{\text{EBIT}}{\text{EBT}} = \frac{52000}{50400} = 1.03$

Degree of Combined Leverage = $\frac{\text{Contn}}{\text{EBT}} = \frac{72000}{50400} = 1.43$

Q3

Income statement	₹
Turnover (4,00,000 x 2)	8,00,000
Less: Variable Cost @ 60%	4,80,000
Contribution	3,20,000
Less: fixed op. cost	(2,00,000)
EBIT	1,20,000
Less: Interest (160000 @ 10%)	16000
EBT	104000

(i) Operating leverage = $\frac{\text{Contn}}{\text{EBIT}} = \frac{320000}{120000} = 2.67$ times

Financial leverage = $\frac{\text{EBIT}}{\text{EBT}} = \frac{120000}{104000} = 1.15$ times.

Combined Leverage = $\frac{\text{Contn}}{\text{EBT}} = \frac{320000}{104000} = 3.08$ times.

(ii) $\text{EBIT} = \frac{\text{EPS} \times \text{No. of shares}}{(1-t)} + \text{Interest}$

$= \frac{5 \times 12000}{0.65} + 16000 = ₹\ 108,308/-$

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Q4

Contribution = Rs.5 ×10 lakh bottles = Rs.50,00,000

EBIT = Rs.40,00,000 (50,00,000 –10,00,000)

Interest = Rs. 1,20,000

EBT = (4000000 – 120000) = Rs.38,80,000

(i) Degree of Operating Leverage = $\frac{\text{Contribution}}{\text{EBIT}} = \frac{`\ 50,00,000}{`\ 40,00,000}$ =1.25 times

(ii) Degree of Financial Leverage = $\frac{\text{EBIT}}{\text{EBT}} = \frac{40,00,000}{38,80,000}$ =1.03 times

(iii) Degree of Total Leverage

= DOL × DFL

= 1.25 × 1.03 = 1.29

or, $\frac{\text{Contribution}}{\text{EBT}} = \frac{`\ 50,00,000}{`\ 38,80,000} = 1.29$

Q5

(i) Degree of Financial Leverage:

FL - EBIT/Profit before Tax = 1,60,000/1,40,000 = 1.1428

If EBIT increases by 10%, the taxable income will increase by 1.1428 x 10 = 11.428% and it may be verified as follows:

EBIT (after 10% increase)	₹ 1,76,000
Less interest	20,000
Profit before Tax	1,56,000

Increase in taxable income is ₹ 16,000 i.e 11.428% of ₹1,40,000

(ii) Degree of Operating beverage:

OL = Contribution/EBIT= 5,60,000/1,60,000 = 3.50

If sale increases by 10%, the EBIT will increase by 3.50 x 10 = 35% and it may be verified as follow:

Sales (after 10% increase)	₹8,80,000
Less variable expenses @ 30%	2,64,000
Contribution	6,16,000
Less Fixed cost	4,00,000
EB1T	2,16,000

Increase in EBIT is ₹ 56,000 i.e. 35% of ₹ 1,60,000

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Q6

Particulars	Firms			
	P	Q	R	S
Sales (units)	10,000	10,000	10,000	10,000
Sales revenue (unit × price)	2,00,000	3,20,000	5,00,000	7,00,000
Less: Variable cost (units × VC per unit)	60,000	1,60,000	2,00,000	5,00,000
Less : Fixed cost	1,60,000	80,000	4,00,000	NIL
EBIT	(20,000)	80,000	(1,00,000)	2,00,000

DOL = (Current sales - Variable cost)/Current EBIT
DOL(P) = (2,00,000 - 60,000)/20,000= 7
DOL(Q) =(3,20,000 -1,60,000)/80,000 = 2
DOL (R) = (5,00,000 - 2,00,000)/1,00,000 = 3
DOL (S) = (7,00,000 - 5,00,000)/2,00,000 = 1

The operating leverage exists only when there are fixed cost. In this case of firm S, there is no magnified effect on the EBIT due to change in sales. Operating leverage is maximum in firm P, followed by firm R and minimum in firm Q. The interpretation of DOL of 7 is that 1% change in sales results in 7% change in EBIT level in the direction of the change of sales level of firm P.

Q7.

(i) ROI = EBIT/Investment×100
EBIT = Sales – VC – FC = ₹ 75 lakh – ₹ 42 lakh – ₹ 6 lakh = ₹ 27 lakh
ROI = ₹ 27 lakh / ₹ 100 lakh×100 = 27 %
(ii) Yes, the firm has favourable financial leverage as its ROI is higher than the interest on debt.
(iii) Asset turnover = Sales/Total Assets or Total Investments = ₹ 75 lakh/₹ 100 lakh = 0.75. It is lower than the industry average.
(iv) Operating Leverage = (Sales - Variable Costs) / EBIT = (₹75 lakh - ₹42 lakh) / ₹27 lakh = 1.22
Financial Leverage = EBIT /(EBIT – Interest) = 27 lakh / 27 lakh - 4.05 lakh = 1.18
Combined Leverage = (Sales – VC)/ (EBIT – Interest) = 33lakh /22,95,000 = 1.44
Alternatively, = OL × FL = 1.22 × 1.18 = 1.44
(v) EBIT at sales level of ₹ 50 lakh

Particulars	Amount (₹)
Sales revenue	50 Lakh
Less: Variable costs (₹ 50 lakh × 0.56)	28 Lakh
Less: Fixed costs	6 Lakh
EBIT	16 Lakh

(vi)Zero EBT implies Break-Even Sales (BESR)= FC/CV ratio, CV ratio = ₹ 33 lakh/₹75 lakh = 44%.
BESR = (₹ 6 lakh + ₹ 4.05 lakh)/0.44 = ₹ 22,84,091.
Confirmation Table:

Particulars	Amount (₹)
Sales revenue	22,84,091
Less: VC (0.56)	12,79,091
Less: FC (operating)	6,00,000
Less: Interest (additional fixed cost)	4,05,000
EBT	Zero

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Q8

(i) **Determination of EPS**

Particulars	Amount (₹)
EBIT	1,86,000
Less interest (0.14 × ₹ 5,00,000)	70,000
EBT	1,16,000
Less taxes (0.35)	40,600
EAT	75,400
Less: Dividend on preference shares	15,000
Earnings available for equity holders	60,400
EPS (₹ 60,400 ÷ 4,000)	15.1

(ii) **Change in EPS**

Particulars	Change in EBIT (₹)	
	(+30%)	(–30%)
EBIT	2,41,800	1,30,200
Less interest	70,000	70,000
EBT	1,71,800	60,200
Less taxes (0.35)	60,130	21,070
EAT	1,11,670	39,130
Less: Dividends payable on preference shares	15,000	15,000
Earnings available for equity holders	96,670	24,130
EPS	24.17	6.03
Change in EPS (Δ EPS ÷ EPS)	(+60.05%)	(–60.05%)

(iii) DFL = EBIT / EBIT – I – [Dp/(1 – t)]
= ₹ 1,86,000 / (₹ 1,86,000 – ₹ 70,000 – [₹ 15,000 ÷ (0.65)]
= 2 (times).

(iv) The additional data required to compute the operating and combined leverage relate to sales and variable cost.

Q9

Computation of Operating Leverage, Financial Leverage, Combined Leverage for the three firms:

	K	L	M
Production Qty	60,000	15,000	1,00,000
Selling Price	0.6	5	0.10
Sales	36,000	75,000	10,000
V.C	(0.2)	(1.50)	(0.02)
	12,000	22,500	2,000
Contribution	24,000	52,500	8,000
Fixed cost	7,000	14,000	1,500
EBIT	17,000	38,500	6,500
Operating Leverage	24,000	52,500	8,000
	17,000	38,500	6,500
EBIT	1.41	1.36	1.23
(-) Interest	17,000	38,500	6,500
EBT	4,000	8,000	-
Financial Leverage	17,000	38,500	6,500
	13,000	30,500	6,500
	1.30	1.26	1
	24,000	52,500	8,000
Combined Leverage $\left(\frac{C}{EBT}\right)$	13,000	30,500	6,500
	1.846	1.72	1.23

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