5. LEVERAGES

ASSIGNMENT SOLUTIONS

PROBLEM NO: 1

a) **Income statement**

Particulars	Amount (Rs. In lakhs)
Sales	40
Less: Variable cost	(25)
Contribution	15
Less: Fixed cost	(6)
EBIT	9
Less: Interest	(3)
EBT	6

b)

i) Operating leverage $= \frac{\text{Contribution}}{\text{EBIT}} = \frac{15\text{lakhs}}{9\text{lakhs}} = 1.67$ times

ii) Financial leverage $= \frac{\text{EBIT}}{\text{EBT}} = \frac{9\text{lakhs}}{6\text{lakhs}} = 1.5$ times

iii) Combined leverage = OL x FL = 1.67 x 1.50 = 2.505

iv) Return on investment = EBIT/ Capital employed = 9/75 = 12%

v) Sales increases by 20% =
Operating leverage is 1.67. So if sales is increased by 20%.
EBIT will be increased by 1.22 × 10 i.e. 33.40% (approx.) = 9 lakhs x 33.34% = 3,00,000

PROBLEM NO: 2

Statement showing the calculation of degree of various leverages at 2500 units and 3000 units

Particulars	2,500 units (Rs.)	3,000 units (Rs.)
A. Sales	35,000	42,000
B. Less: Variable Costs	22,500	27,000
C. Contribution	12,500	15,000
D. Less: Fixed Costs	10,000	10,000
E. Earnings Before Interest & Tax (EBIT)	2,500	5,000
F. Operating Leverage (Contribution/EBIT)	5	3

Working Note:- Estimation of fixed cost

Break even units = 2000 units.

We know that , at 2000 breakeven units

Total sales revenue = Total cost

Contribution = Fixed cost

Fixed cost = 2000 x (14-9) = 10,000

PROBLEM NO: 3

Part A: Financial Leverage

Estimation percentage of increase in EBT if there is 6% increase in EBIT,

a) DFL = EBIT / EBT = 40,000 / 35,000 = 1.143 times.

b) At any cost 1% change in EBIT leads to 1.143% change in EBT.

∴ If 6% change in EBIT = 6 x 1.143 = 6.858% ≅ 6.86%

Verification for academic interest

Particulars	At 100%	At 106%
a) EBIT	40,000	42400
b) Interest	(5,000)	(5,000)
c) EBT	35,000	37400
	% of increase in EBT = $\left(\frac{37,400-35,000}{35,000}\right)$ = 6.86%	

Part B: Operating Leverage

Estimation percentage of increase in EBIT if there is 10% increase in sales:

a) DOL = Contribution / EBIT = 1,40,000 / 40,000 = 3.5 times.

b) At any cost, 1% change in sales leads to 3.5% change in EBIT.

∴ If 10% change in Sales = 10 x 3.5 = 35 %

Verification for academic interest

Particulars	Amount at 100%	Amount at 110%
a) Sale	2,00,000	2,20,000
b) Variable Cost	(60,000)	66,0000
c) Contribution	1,40,000	1,54,000
d) Fixed Cost	(1,00,000)	1,00,000
e) EBIT	40,000	54,000
	% of increase in EBIT = $\left(\frac{54,000-40,000}{40,000}\right)$ = 35%	

Part C: Combined Leverage

Estimation percentage of increase in EBT if there is 6% increase in sales:

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

Or = Contribution / PBT

DCL = 1,40,000 / 35,000 = 4 times

At any cost, 1% change in sales leads to 4% change in EBT.

∴ If 6% increase in Sales = 6 x 4 = 24 %

Verification for academic interest

Particulars	At 100%	At 106%
a) Sales	2,00,000	2,12,000
b) Variable Cost	60,000	(63,600)
c) Contribution	1,40,000	1,48,400
d) Fixed Cost	(1,00,000)	(1,00,000)

e) EBIT	40,000	48,400
f) Interest	(5,000)	(5,000)
g) EBT	35,000	43,400
	% of increase in EBT = $\left(\frac{43,400-35,000}{35,000}\right)$ = 24%	

PROBLEM NO: 4

a) Calculation of Leverages:

Particulars	P Ltd.	Q Ltd.
Operating Leverage = $\frac{\text{Contribution}}{\text{EBIT}}$	2	2.33
Financial Leverage = $\frac{\text{EBIT}}{\text{EBT}}$	1.5	1.5
Combined Leverage = O.L x F.L (or) $\frac{\text{Contribution}}{\text{EBT}}$	3	3.495

b) Comments:

i) The operating risk of Q Ltd. is more than that of P Ltd.

ii) Both the company stand in equal risk position with respect to financial leverage.

iii) The combined risk of Q Ltd. is more than that of P Ltd.

PROBLEM NO: 5

1. Total contribution = 1,000 units x Rs. 60 per unit	Rs. 60,000
2. DCL $\frac{\text{Contribution}}{\text{EBT}} = \frac{\text{Rs. 60,000}}{\text{EBT}} = 24$. So, EBT $= \frac{\text{Rs. 60,000}}{24}$	Rs. 2,500
3. Earnings after tax = EBIT(1- Tax) = Rs. 2,500(1-0.30)	**Rs. 1,750**

PROBLEM NO: 6

Income Statement

Particulars	A	B	C
Sales (W.N-2)	3,600	8,000	12,000
Less: Variable cost (b/f)	(2,400)	(6,000)	(6,000)
Contribution	1,200	2,000	6,000
Less: Fixed Cost (b/f)	(900)	(1,600)	(4,000)
EBIT (W.N-1)	300	400	2,000
Less: Interest	(200)	(300)	(1,000)
EBT (W.N-1)	100	100	1,000
Less: Tax	(45)	(45)	(450)
EAT	55	55	550

Working Note 1: Calculation of EBIT basing on DFL and contribution basing on DOL

Particulars	A	B	C
Degree of financial Leverage (DFL)	3:1	4:1	2:1
$\frac{\text{EBIT}}{\text{EBT}} = \frac{EBIT}{EBIT - \text{interest}}$	$\frac{EBIT}{EBIT-200} = 3$	$\frac{EBIT}{EBIT-300} = 4$	$\frac{EBIT}{EBIT-1000} = 2$
	3 EBIT-600 = EBIT	4 EBT - 1200 = EBIT	2 EBIT – 2,000 = EBIT
EBIT (A)	EBIT = 300	EBIT = 400	EBIT = 2000

Degree of operating leverage (DOL)	4:1	5:1	3:1
$\frac{\text{Contribution}}{\text{EBIT}} = \text{DOL}$	$\frac{Contribution}{300} = 4$	$\frac{Contribution}{400} = 5$	$\frac{Contribution}{2000} = 3$
Contribution (B)	1,200	2,000	6,000

Working Note 2: Calculation of sales

Particulars	A	B	C
Given VC As a % of sales	66.66%	75%	50%
$\frac{\text{Contribution}}{\text{Sales}}$	33.33%	25%	50%
Contribution	1,200	2,000	6,000
Sales	$3,600\left(\frac{1,200}{33.33\%}\right)$	$8,000\left(\frac{2,000}{25\%}\right)$	$12,000\left(\frac{6,000}{50\%}\right)$

PROBLEM NO: 7

Working Note 1: Estimation of EBIT basing on DFL

Degree of Financial Leverage = $\frac{\text{EBIT}}{\text{EBT}}$ = 3

$\frac{\text{EBIT}}{\text{EBIT} - \text{Rs.10,00,000}}$ = 3

3 EBIT - Rs.30,00,000 = EBIT

EBIT = $\frac{\text{Rs. 30,00,000}}{2}$ = Rs.15,00,000

Working Note 2: Estimation of contribution basing on DOL

Contribution = Fixed Cost + EBIT = Rs.50,00,000 + Rs.15,00,000 = Rs.65,00,000

a) Degree of Operating Leverage = $\frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{Rs. 65,00,000}}{\text{Rs. 15,00,000}}$ = 4.33 times

b) Sales Volume = $\frac{\text{Total Contribution}}{\text{Contribution Per Unit}} = \frac{\text{Rs. 65,00,000}}{\text{Rs.200}}$ = 32,500 units

PROBLEM NO: 8

a)

Step 1: Finding of Sales Revenue basing on Asset turnover ratio

Given total Asset turnover ratio = $\frac{\text{Turnover / sales}}{\text{Total Assets}}$ = 3

$\frac{\text{Sales}}{2,00,000}$ = 3

Sales = 6,00,000

Step 2: Profit Statement:

Particulars	Amount (Rs.)
a) Sales revenue	6,00,000
b) **Less:** Variable Cost (Rs.6,00,000 x 40%)	2,40,000
c) Contribution	**3,60,000**
d) **Less:** Fixed Cost	1,00,000
e) EBIT	**2,60,000**
f) **Less:** Interest (80,000 x 10%)	8,000

g) EBT	**2,52,000**
h) **Less:** Tax @ 35%	88,200
i) EAT / EAESH	**1,63,800**
j) No. of Equity Shares $\frac{60,000}{10}$	6,000 Shares
k) EPS $\left(\frac{\text{EAESH}}{\text{No.of Shares}}\right)$	27.3

Step 3: Calculation of Leverages:

Degree of Operating Leverage $= \frac{\text{Contribution}}{\text{EBIT}} = \frac{3,60,000}{2,60,000} = 1.38$

Degree of Financial Leverage $= \frac{\text{EBIT}}{\text{EBT}} = \frac{2,60,000}{2,52,000} = 1.031$

Degree of Combined Leverage $= 1.39 \times 1.031 \cong 1.43$ (or) $\frac{3,60,000}{2,52,000} = 1.42$

b)

EPS is Rs. 1:

We know that EPS $= \frac{(EBIT - Int)(1-t)}{n}$

$1 = \frac{(EBIT - 8,000)(1-0.35)}{6,000}$

$6,000 = (EBIT - 8,000)(0.65)$

$EBIT - 8,000 = \frac{6,000}{0.65} = 9,230.76$

$EBIT = 17,230.76$

If the level of EBIT is 17,231 then EPS will be equal to Rs. 1

EPS is Rs. 3:

We know that EPS $= \frac{(EBIT - Int)(1-t)}{n}$

$3 = \frac{(EBIT - 8,000)(1-0.35)}{6,000}$

$EBIT - 8,000 = \frac{18,000}{0.65}$

$EBIT = 35,692.31$

EPS is Rs. 0:

We know that EPS $= \frac{(EBIT - Int)(1-t)}{n}$

$0 = \frac{(EBIT - 8,000)(1-0.35)}{6,000}$

$EBIT = 8,000$

PROBLEM NO: 9

Income Statement:

Particulars	Amount (Rs.)
Sales	100,00,000
Less: Variable cost (60% of Rs. 100,00,000)	(60,00,000)
Contribution	40,00,000

Less: Fixed costs	(10,00,000)
Earnings before interest and tax (EBIT)	30,00,000
Less: Interest on debt (@ 10% on Rs 45 lakhs)	(4,50,000)
Earnings before tax (EBT)	25,50,000

i) $ROI = \frac{EBIT}{Capital\ Employed} \times 100 = \frac{30,00,000}{55,00,000 + 45,00,000} \times 100 = 30\%$

(ROI is calculated on Capital Employed)

ii) ROI = 30% and Interest on debt is 10%, hence, it has a favourable financial leverage.

iii) Capital Turnover $= \frac{Net\ sales}{Capital} = \frac{Rs.1,00,00,000}{Rs.1,00,00,000} = 1.00$

Which is very low as compared to industry average of 3.

iv) Calculation of Operating, Financial and Combined leverages

a) Operating Leverage $= \frac{Contribution}{EBIT} = \frac{40,00,000}{30,00,000} = 1.33$

b) Financial Leverage $= \frac{EBIT}{EBT} = \frac{30,00,000}{25.50,000} = 1.17$

c) Combined Leverage $= \frac{Contribution}{EBT} = \frac{40,00,000}{25,50,000} = 1.56$

Or = Operating Leverage × Financial Leverage = 1.33 × 1.17 = 1.55 (approx)

v) Operating leverage is 1.33. So if sales is increased by 10%. EBIT will be increased by 1.33 × 10 i.e. 13.30% (approx.)

vi) Since the combined Leverage is 1.56, sales have to drop by 100/1.56 i.e. 64.10% to bring EBT to Zero

Accordingly, New Sales = Rs. 100,00,000 × (1 - 0.6410)

= Rs. 100,00,000 × 0.359

= Rs. 35,90,000 (approx.)

Hence at Rs. 35,90,000 sales level EBT of the firm will be equal to Zero.

vii) Financial leverage is 1.187. So, if EBIT increases by 20% then EBT will increase by 1.17 × 20 = 23.4% (approx)

PROBLEM NO: 10

Particulars	Situation A		Situation B	
	Plan XY	Plan XM	Plan XY	Plan XM
Selling price p.u	30	30	30	30
Variable cost p.u	(20)	(20)	(20)	(20)
Contribution per unit	10	10	10	10
Sales (units)	6,000	6,000	6,000	6,000
Total Contribution	60,000	60,000	60,000	60,000
Fixed Cost	(20,000)	(20,000)	(25,000)	(25,000)
EBIT	40,000	40,000	35,000	35,000
Interest (W.N)	(4,800)	(1,200)	(4,800)	(1,200)
EBT	**35,200**	**38,800**	**30,200**	**33,800**
DOL = $\frac{Contribution}{EBIT}$	$\frac{60,000}{40,000} = 1.5$	$\frac{60,000}{40,000} = 1.5$	$\frac{60,000}{35,000} = 1.71$	$\frac{60,000}{35,000} = 1.71$

DFL = $\frac{EBIT}{EBT}$	$\frac{40,000}{35,200}$ = 1.14	$\frac{40,000}{38,800}$ = 1.03	$\frac{35,000}{30,200}$ = 1.16	$\frac{35,000}{33,800}$ = 1.04
DCL = OL X FL	1.5 x 1.14 = 1.71	1.5 x 1.03 = 1.545	1.71 x 1.16 = 1.984	1.71 x 1.04 = 1.778

Working Note: Interest Calculation

Plan XY = 40,000 x 12% = 4,800

Plan XM = 10,000 x 12% = 1,200

PROBLEM NO: 11

i) Operating Leverage = $\frac{Contribution}{EBIT} = \frac{3,90,000}{3,00,000}$ = 1.30 times

Financial Leverage = $\frac{EBIT}{EBT} = \frac{3,00,000}{2,60,000}$ = 1.15 times

ii) Preference Dividend Cover = PAT/Preference share Dividend

= 1,82,000/50,000 = 3.64 times

Equity Dividend Cover = PAT - Pref. div/Equity Dividend

=1,82,000 - 50,000/1,20,000 = 1.10 times

iii) Earning yield= EPS/Market Price X100 = 1,32,000/ 80,000 = 8.25%

Price Earnings Ratio = Market price / EPS = 20/1.65 = 12.1 times

iv) Net Funds Flow = Net Profit After Tax + Depreciation- Total Dividend

= 1,82,000 + 90,000 - (50,000 + 1,20,000)

= 2,72,000 - 1,70,000

= 1,02,000

Working Note:-1

Calculation of EBIT

EBIT = (EAT/ 1- Tax) + Interest = 1,82,000/1- 0.3 + 40,000 = 3,00,000

Working Note:-2

Calculation of Contribution

Contribution = Sales – Variable cost Or **EBIT + Fixed cost** = 3,00,000 + 90,000 = 3,90,000

PROBLEM NO: 12

Working Notes:

a) Financial Leverage = $\frac{Combined\ Leverage}{Operating Leverage} = \frac{6}{3} = 2$

Financial Leverage = $\frac{EBIT}{EBT - \left(\frac{Preference dividend}{1 - Tax}\right)} = \frac{EBIT}{EBIT - 2,50,000 - 2,00,000} = 2$

EBIT = 2 EBIT - Rs.9,00,000

EBIT = Rs.9,00,000

b) Operating Leverage = $\frac{Contribution}{EBIT} = 3$

EBIT = Rs.9,00,000 x 3 = Rs.27,00,000

Sales = Variable Cost + Contribution = Rs.10,00,000 + Rs.27,00,000 = Rs.37,00,000

PROBLEM NO: 13

Company	M	N	P	Q	R
Degree of Operating Leverage = $\frac{\text{Change in EBIT}}{\text{Change in Sales}}$ (in times)	$\frac{26\%}{28\%} = 0.93$	$\frac{34\%}{27\%} = 1.26$	$\frac{38\%}{25\%} = 1.52$	$\frac{43\%}{23\%} = 1.87$	$\frac{40\%}{25\%} = 1.60$
Degree of Combined Leverage = $\frac{\text{Change in EPS}}{\text{Change in Sales}}$ (in times)	$\frac{32\%}{28\%} = 1.14$	$\frac{26\%}{27\%} = 0.96$	$\frac{23\%}{25\%} = 0.92$	$\frac{27\%}{23\%} = 1.17$	$\frac{28\%}{25\%} = 1.12$

PROBLEM NO: 14

Step-1: Calculation of EPS in A Ltd. & B Ltd.

Particulars	A Ltd.	B Ltd.
EBIT	1,20,000	1,20,000
Less: Interest	-	(6,00,000 × 15%) 90,000
EBT	1,20,000	30,000
Less: Tax @ 50%	60,000	15,000
EAT / EAESH (A)	60,000	15,000
No. of Equity shares (B)	(10 I/10) 1,00,000	(40 I/10) 40,000
EPS (A/B)	0.6/-	0.375/-

Step-2: Some reasons for higher level of EPS in B Ltd.

a) No. of shares in B Ltd. are less when compared to A Ltd.

b) B Ltd. will get the advantage of tax shield, as interest is an allowable expenditure.

c) The interest on debentures for B Ltd. is just 15% whereas return on capital employed is 12%, the additional benefit will also be passed on to equity share holders.

THE END