Solutions

Break Even Analysis & Leverages

Sol Q-1)

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

$$= \frac{Q(P-V)}{Q(P-V)-F} = \frac{800 \times (1200-800)}{800(1200-800)-200000}$$

$$= \frac{800 \times 400}{(800 \times 400)-200000} = \frac{320000}{320000-200000}$$

$$= \frac{320000}{120000} = 2.666$$

DOL or 2.67

If the Quantity manufactured & sales to 1000, the DOL will be

$$DOL = \frac{1000(1200-800)}{1000(1200-800)-200000}$$

$$= \frac{1000 \times 400}{(1000 \times 400)-200000}$$

$$= \frac{400000}{400000-200000} = \frac{400000}{200000}$$

DOL = 2

Sol. Que-2
(Practice)

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

$$= \frac{Q(P-V)}{Q(P-V) - F}$$

$$= \frac{5000(700-300)}{5000(700-300) - 1000000}$$

$$= \frac{5000 \times 400}{(5000 \times 400) - 1000000}$$

$$= \frac{2000000}{2000000 - 1000000} = \frac{2000000}{1000000}$$

$$\boxed{DOL = 1}$$

If the quantity manufactured & sold is increase to 8000 units then DOL will be:-

$$DOL = \frac{8000(700-300)}{8000(700-300) - 1000000}$$

$$= \frac{8000 \times 400}{(8000 \times 400) - 1000000}$$

$$= \frac{3200000}{3,200000 - 1000000} = \frac{3200000}{2200000}$$

$$\boxed{DOL = 1.45}$$

F = Fixed Cost
P = Price
V = Variable Cost

Sol. Qu-3:-

$$\text{BEP in Units} = \frac{F}{(P-V)}$$

$P-V$ = contribution Margin

$$= \frac{25000}{8}$$

$$= 3125 \text{ Units}$$

Since contribution margin ratio is 20%

& $P - V = 8$ ——— (1)

$$\frac{V}{P} = 1 - .2 = .8 \quad \boxed{\text{i.e } V = .8P}$$

From equation (1)

$$P - .8P = 8$$

$$.2P = 8$$

$$P = \frac{8}{.2} = 40/-$$

also $Q(P-V) - F = 70000$

$$8Q - 25000 = 70000$$

$$8Q = 95000$$

$$Q = 11875$$

So sales = Quantity × Price

$$= 11875 \times 40 = \text{Rs } 4,75,000$$

Solution Que 4-6 (Practice)

$$\text{BEP in Units} = \frac{F}{(P-V)} = \frac{30000}{12}$$

$$= 2,500 \text{ units}$$

To calculate sales

$$P - V = 12 \quad \text{---------- eq (1)}$$

$$\frac{V}{P} = 1 - .2 = .8$$

i.e. $V = .8P$

Substituting this value in eq (1)

$$P - .8P = 12$$

$$.2P = 12$$

$$P = \frac{12}{.2} = 60/-$$

also $Q(P-V) - F = 90000$

$$12Q - 30000 = 90000$$

$$12Q = 120000$$

$$\boxed{Q = 10,000}$$

Sales $= Q \times P$

$= 10000 \times 60$

$= 6000000$

Sol Ques-5:- SP = 200/-, VC = Rs 120, FC = Rs 96000

(i) BEP = $\frac{FC}{S-V}$ or $\frac{FC}{C}$ where C = S - V

= $\frac{96000}{200-120}$ = $\frac{96000}{80}$ = 1200 Units

(ii) Current Level of Production = 2000 Units

Profit = Total Sales - Total Cost

= TS - (FC + VC)

= TS - [FC + (Units × VC per unit)]

= 2000 × 200/- - [96000 + 2000 × 120]

= 400000 - [96000 + 240000]

= 400000 - 336000

Current Profit = Rs 64000

Now if Production is increased by 10%

2000 + 10% of 2000 Units

= 2200 Units

So Profit = 2200 × 200 - [96000 + 2200 × 120]

= 440000 - 360000

= 80000

Hence, the % increase in Profit

= $\frac{80000 - 64000}{64000} \times 100 = 25\%$

(iii) 10% increase in selling price
existing price = 200/-
200 + 10% of 20 = 220

$$\text{New BEP} = \frac{FC}{S-V} = \frac{9600}{220-120}$$

$$= \frac{9600}{100} = 960 \text{ units}$$

(iv) if fixed cost increased by 50%
existing FC = Rs 9600
+50% increase = 4800
14400

$$\text{BEP} = \frac{FC}{S-V} = \frac{14400}{200-120} = 180 \text{ units}$$

(v) if variable cost increase by Rs 10 per unit.
existing VC = 120
+ Increase = 10 Rs 130 per unit

$$\text{BEP} = \frac{FC}{S-V}$$

$$= \frac{9600}{200-130} = \frac{9600}{70}$$

$$= 1371.42 \text{ units}$$

Sol Que-6:-

(i) BEP in Units $= \frac{F}{S-V}$ =

or

$= \frac{10\,000}{30-16} = \frac{10\,000}{14}$

$= 714.28$

$= 714$ units

(ii) Current Level of profit

$= Q(S-P) - FC$

$= 3000(30-16) - 10000$

$= 3000 \times 14 - 10000$

$= 42000 - 10000$ = Rs 32000

if 10% increase in production will raise profit to

$= 3300(30-16) - 10000$

$= 3300 \times 14 - 10000$

$= 46200 - 10000 = 36200$

Hence % increase in profit

$= \frac{36200 - 32000}{32000} \times 100$

$= \frac{4200}{32000} \times 100 = 13.125\%$

(c) With a 10% increase in selling price then new BEP will be

$$BEP = \frac{10000}{33-16}$$

$$= \frac{10000}{17} = 588.23$$

(d) If 5% increase in FC then BEP

$$BFC = \frac{(10000 + 5000)}{30-16}$$

$$= \frac{15000}{14} = 1071.42$$

(e) if VC increase to 20 per bottle the new BEP

$$BFP = \frac{FC}{S-V} = \frac{10000}{30-20}$$

$$= \frac{10000}{10} = 1000 \text{ Unit}$$

Sol Qu-7

(a)

BEP for A $= \frac{40000}{40-30} = \frac{40000}{10} = 4000$ Units

BEP for B $= \frac{120000}{60-40} = \frac{120000}{20} = 6000$ Units

BEP for C $= \frac{160000}{90-50} = \frac{160000}{40} = 4000$ units

BEP for the company as a whole $= \frac{(4000*120000+160000)}{S-V}$

$= \frac{320000}{190-120} = \frac{320000}{70}$

$= 4571.42$ units

(b) The Combined contribution margin ratio :-

$= \frac{S-V}{S}$

$= \frac{190-120}{190} = .3684$

Sol. Qus. 6)
(Practical)

(a) BEP for X = $\frac{50000}{30-20} = \frac{50000}{10} = 5000$ Units

BEP for Q = $\frac{90000}{50-30} = \frac{90000}{20} = 4500$ Units

BEP for R = $\frac{120000}{80-40} = \frac{120000}{40} = 3000$ Units

BEP for the company as a whole

$= \frac{260000}{160-90}$ — i.e (5000+90000 +120000

$= \frac{260000}{70} = 3714.285$ Units.

(b) Combined Contribution Margin Ratio

$= \frac{S-V}{S}$

$= \frac{160-90}{160} = \frac{70}{160}$

$= .4375$

Sol. Que.-9

$$EBIT = [Q(P-V) - D - F]$$

$= 50000\,(80-48) - 20,000 - 160000$

$= 50000 \times 32 - 20000 - 160000$

$= 1600000 - 180000$

$= 1420000$

$$DFL = \frac{EBIT}{EBIT - I} = \frac{1420000}{1420000 - 60000}$$

$$= \frac{1420000}{1360000} = 1.0441$$

Sol Que 10 →

$$EBIT = [Q(P-V) - D - F]$$

$= 20000\,(40-24) - 10000 - 80000$

$= 320000 - 90000$

$= 230000$

$$DFL = \frac{EBIT}{EBIT - I} = \frac{230000}{230000 - 30000}$$

$$= \frac{230000}{200000} = 1.15$$

$$\boxed{DFL = 1.15}$$

Sol. Que-11:

Firm.	A	B	C
EBIT	300000(30-20) − 500000 = 2500000	200000(40-25) − 800000 = 2200000	500000(160-50) − 1300000 = 4200000
EPS	(2500000 − 1500000)×.7 − 700000 = 1645000 − 700000 = 1575000 = 157500/15000 = 10.5	(2200000 − 2000000)×.60 − 900000 = 1200000 − 900000 = 1110000 = 1110000/200000 = 5.55	(4200000 − 1500000)×.50 − 1700000 = 2025000 − 1700000 = 1855000 = 1855000/170000 = 10.91
BEP	(500000+150000)/(30-20) = 650000 Units	800000+400000/(40-25) = 60000 Units	(1300000+150000)/(160-50) = 13182 Units
DOL	300000(30-20)/2500000 = 1.2	200000(40-25)/2200000 = 1.36	500000(160-50)/4200000 = 1.309
DFL	2500000/(2500000-150000) = 1.06	2200000/(2200000-100000) = 1.0476	4200000/(4200000-100000) = 1.024
DTL	= 1.2 × 1.06 = 1.272	= 1.36 × 1.04 = 1.426	= 1.309 × 1.024 = 1.340

Sol Qus 12

Firm	X	Y	Z
EBIT	2 20,000 (20-15) −40000 = 60000	10000 (50-30) −70000 = 130000	3000 (100-40) −180000 = 80000
EPS	[(60,000 − 10000) × .6 − 5000] / 10000 = 2.5	[(130000 − 20000) × .5 − 5000] / 12000 = 4.17	(80000 − 40000) .4 − 10000 / 15000 = .4
BEP	(40000 + 10000) / 20 − 15 = 10000	70000 + 20000 / 50 − 30 = 4500	100000 + 40000 / 100 − 40 = 2334
DOL	20000 (20-5) / 60000 = 1.67	10000 (50-30) / 130000 = 1.54	3000 (100-40) / 80000 = 2.25
DFL	60000 / 60000 − 10000 = 1.2	130000 / 130000 − 20000 = 1.18	80000 / 80000 − 40000 = 2.0
DTL	1.67 × 1.2 = 2.00	1.54 × 1.18 = 1.82	2.25 × 2 = 4.5