① $CM_{(pu)}$ = Selling Price (pu) − Variable Cost (pu)

② CM (total) = CM (pu) × Sales volume.

③ CM Ratio = $\frac{CM\ (pu)}{SP\ (pu)}$ or $\left(\frac{SP - VC}{SP}\right)_{(pu)}$

④ $BEP_{(pu)} = \frac{TFC}{CM\ (pu)}$

⑤ BEP (amt) = $\frac{TFC}{CMR}$

⑥ Required sales (pu) = $\frac{TFC + Target\ NI}{CM\ (pu)}$

⑦ " " (amt) = $\frac{TFC + Target\ NI}{CMR}$.

Profit (NIncome) = Sales revenue − V.C − TFC

= (SP (pu) × Sales volume) − (VC (pu) × Sales volume) − TFC

= (SP (pu) − VC (pu)) sales volume − TFC.

MOS = Actual sales (or expected) − BEP

MOS Ratio = $\frac{MOS}{\text{Actual (Expected) Sales}}$

CVP income statement:

Sales revenue	: xxxx
less: VC	: xxxx
CM	: xxxx
Less: FC	: xxxx
Net profit/loss	: xxxx

Classroom:

E22-11 2016:

Net Income = 210 000.

SP per unit = 150

VC " " = 90

FC = 570 000.

by 2017 tagetted NI = ~~52000~~ increase = 52 000

(Soln): a) number of units sold → sales volume.

we know, Net Income = ((SP(pu) - VC(pu)) × sales volume) - TFC

or, 210,000 = ((150 - 90)) × sales volume) - 570 000

or, Sales volume = 13 000 unit (Ans)

b) We know, required sales = $\frac{\text{TFC} + \text{Target Net Income}}{\text{CM (pu)}}$.

Here, TFC = 570 000

Target NI = 52 000 + 210 000 = 262,000

CM (pu) = SP(pu) - VC (pu)

= 150 - 90 = 60.

So, required sales = $\frac{570\,000 + 262000}{60}$

= 13.867 units.

c) What would be the selling price to reach desired profit?

we know, Profit = ((SP - VC) × sales volume) - TFC.

or, 262000 = ((SP - 90) × 13000) - 570,000.

or, SP = 159. ~~unit~~ per unit.

P22-3A.

Given 2017 → for 500 000 units → sales revenues = 2500 000.
Costs + expenses = 2600 000.
Net loss = 100 000.

Total VC = 1750,000
Total FC = 850,000.

a) we know BEP = $\frac{TFC}{CMR}$ (in dollars).

So, TFC = 850,000.

CMR = SP per unit − VC per unit.

so SP per unit = Sales revenue / units sold.
= 2500 000 / 500 000. = $5

VC " " = Total VC / units sold
= 1750 000 / 500 000 = $3.5

∴ CMR = 5 − 3.5 = $0.3.

so, BEP = $\frac{850\ 000}{0.3}$ = $2,833,334

b) Given alt① increase SP 20%.
alt② sales person salary compensate from 150 000 to 60,000 in TFC. + 5% commission on sales.

So, alt①→
100% যদি SP হয় তাহলে 20% বাড়াব → 120% or 1.2.
So, SP ~~per~~ per unit now = 5 × 1.2 = $6.

CMR = $\frac{SP - VC}{SP}$ = $\frac{6 - 3.5}{6}$ = 0.42

BEP = $\frac{TFC}{CMR}$ = $\frac{\$850\ 000}{0.42}$ = $2 023 810

alt ② → TFC = (850,000 − (150 000 − 60,000))

= 760 000

Sales = $\left(2500\,000 \times \frac{5}{100}\right)$

= 125 000

TVC = 1750 000 + 125 000

= 1875 000.

~~CMR~~ VC per unit = 1875 000 / 5 00000.

= $3.75

$CMR = \frac{SP - VC}{SP} = \frac{5 - 3.75}{5} = 0.25.$

BEP = TFC / CMR = 760,000 / 0.25 = $ 3040 000.

As BEP is less for alt 1, alt 1 is better.

22.4A Current, TFC = $270 000,

per unit SP = $40

Sales volume = 20000.

per unit VC = $24

According to Mary's idea;

TFC = $(24 000 + 270 000)

= $ 294 000.

(pu) SP = $38

Sales volume = ~~20,000~~ 24,000

(pu) VC = $24 (same)

a) Currently, CM = SP - VC = 40 - 24 = $16

BEP = TFC / CM(pu)

= 270 000 / 16

= 16875 unit

According to Mary's plan, CM = 38 - 24 = $14.

BEP = TFC / CM(pu)

= 294 000 / 14

= 21 000 unit.

b) Currently, actual sales = 20 000

BEP = 16,875 unit.

So, Margin of safety = 20 000 - 16875 = 3125.

MOS ratio = $\frac{3125}{20\,000} \times 100$ = 15.625 %.

According to Mary's plan, actual sales = 24,000

BEP = 21 000

MOS = 24 000 - 21 000 = 3 000.

MOS ratio = $\frac{3000}{24000} \times 100$ = 12.5 %.

c) Current CVP income statement:

Sales revenue	: (40 × 20 000)	= 800,000
Less: TVC	: (24 × 20 000)	= 480,000
CM	:	320,000
TFC	:	270,000
Profit	:	50000.

According to Mary, CVP income statement:

Sales revenue	: (38 × 24,000)	= 912,000
TVC	: (24 × 24,000)	= 576,000
CM	:	336 000
TFC	:	294,000
Profit	:	42 000

No, I won't make the changes suggested as the profit is decreasing from 500,000 to 42 000.

Fall-2022

3/b: VC per unit = $50
TFC = $100,000
SP per unit = $150
Sales volume = 1000 units

① (a) BEP in unit $= \frac{TFC}{CM\ (per\ unit)}$

So, CM (pu) = SP (pu) − VC (pu)
= 150 − 50 = $100

∴ BEP $= \frac{100,000}{100} = 1000$ unit

BEP in amount $= \frac{TFC}{CM\ Ratio}$

So, CM Ratio $= \frac{CM}{SP} = \frac{100}{150}$
$= 0.67$

∴ BEP $= \frac{100,000}{0.67} = \$150000$

② (b) ~~When sales at 800 unit,~~
We know profit = ((SP unit per − VC per unit) × sales volume) − TFC
At 800 unit sales,
profit = ((150 − 50) × 800) − 100 000
= −20,000
so it is loss.

At 1000 units:

profit = ((150 − 50) × 1000) − 100 000.

= 0.

No লাভ নাই

At 1200 units

profit = ((150 − 50) × 1200) − 100,000

= 20,000. (profit).

③ Target profit = $80,000.

sales volume = ?

So, required sales in unit = $\frac{\text{TFC} + \text{Target profit}}{\text{cm per unit}}$

$= \frac{100\,000 + 80\,000}{100} = 1800$ units.

SP-22

3.b) (I) unit SP = $520.

" VC = $286.

TFC = $163,800.

We know, BEP (in units) = $\frac{\text{TFC}}{\text{cm (per unit)}}$

cm (per unit) = SP (pu) − VC (pu)

= 520 − 286 = $234.

∴ BEP in unit = $\frac{163,800}{234}$ = 700 unit.

(II) TFC = $195,000.

Target net Income = $75,000.

Sales = x

VC = $\frac{70}{100}x = 0.7x$.

So, cm = x − 0.7x

= 0.3x.

So, cm → 30%

So, required sales = $\frac{\text{TFC} + \text{Target income}}{\text{cm (Au)}}$

$= \frac{195,000 + 75,000}{30\%}$

$= \frac{900,000}{0.3} = 3000000$

(III) Actual sales = $1000,000

BEP = $800,000.

So, MOS = 1000 000 − 800 000

= 200,000

MOS ratio = $\frac{200,000}{1000\,000} \times 100$

= 20 %.

(IV) TFC = $490,000.

unit SP = $7

unit VC = $5.20.

Target net income = $1400 000.

So, CM = SP − VC = 7 − 5.20 = 1.8.

∴ Required sales (in units) = $\frac{\text{TFC} + \text{Target NI}}{\text{CM (per unit)}}$

= $\frac{490\,000 + 1400\,000}{1.8}$

= 1050000 units.

Fall - 2021

3 a) Given, Sales revenue (SP total) = $1600,000.
sales volume = 100 000 units

Selling expenses = $220 000.
" " on VC = $\left(\frac{40}{100} \times 220\,000\right) = 88\,000$
" " " FC = $\left(\frac{60}{100} \times 220\,000\right) = 132\,000$.

Administrative expenses = $272,000.
" " on VC = $(0.2 \times 272000) =$ ~~10 8800~~ 54400
" " " FC = $(0.8 \times 272000) =$ ~~163 200~~ 217600

Man. overhead = $382000.
" " on VC = $(0.7 \times 382000) = 267400$.
" " " FC = $(0.3 \times 382000) = 114600$.

Direct materials = $508,000.
" labour = $282,200.

(I) Current year, sales volume = 100 000.
Sales revenue per unit = 1600 000/100 000
= $16

TVC = (selling expense + Admin expen + Man overhead + DM + DL)
= 88 000 + 54400 + 267400 + 508000 + 282200
= 12 00 000.

TVC per unit = 1200 000/100 000
= $12

Now CM (in unit) = Sales − VC = 16 − 12
= $4.

projected year → Sales volume = $\frac{100\,000 \times 10}{100}$ = 10,000

sales revenue = $1600\,000 + \left(\frac{1600\,000 \times 10\,000}{100\,000}\right)$

= 1760000.

(rev) Sales per unit = (1760000 / 10,000)

= $176

~~ve per unit~~ =

TVC = $\left(\left(88000 + \left(\frac{88000 \times 10000}{100\,000}\right)\right) + 54400 + \left(\frac{54400}{10}\right) + 267400 + \left(\frac{267400}{10}\right) + 508000 + \left(\frac{508000}{10}\right) + 282200 + \left(\frac{282200}{10}\right)\right)$

= 1320.000.

ve per unit = 1320 000 / 10,000

= $132

So, CM in unit = 176 - 132 = $44

(II) TFC = (132 000 + 217600 + 114600)

= 464 200 (CM)

(III) BEP = $\frac{TFC}{CM\ per\ unit} = \frac{464200}{4}$ = 116050 unit.

Sales per unit found in (I) = $116

(iv) Target net income = $250 000.

$$\text{required sales (in unit)} = \frac{\text{TFC} + \text{Target NI}}{\text{cm (per unit)}}$$

$$= \frac{164200 + 250000}{4}$$

$$= 178550 \text{ unit}$$

(v) Let, 178550_{units} be actual sales. as per ques.

$$\text{Margin of safety} = \text{Actual sales} - \text{BEP}$$

$$= 178550 - 116050$$

$$= 62500 \text{ units}.$$

$$\text{Ratio} = \frac{\text{MOS}}{\text{Actual sales}} \times 100$$

$$= \frac{62500}{178550} \times 100 = 35.00\%.$$

COST SHEET

F-22

3/a) $

Cost item	Product Cost			Period Cost		Conversion Cost
	DM	DL	Man. Over	Selling	Gen	
Materials used.	126000		14000 (10%)			
Promotional expen				45000		
Dep on plant			42000		18000 (30%)	
Property tax.			7500.			
Labour cost packn		110000				
Factory supplies			20,000		5000	(Sum of DL + Man Over)
Salaries – sell clerks				50,000		
Total =	126000 + 110000 + 83500			95000	23000	110000 + 83500
	= 220500.			= 118000		= 193500.

SP-22

3/a

Cost item	Production Cost			Period cost	
	DM	DL	M. Over	Sell + Distn	General Admn
Administrah expn					72000.
Dep. office equip					3000
Dep: factory equip			16800		
factor supplies			16800.		
Utilities			4590		5610
Repaires - Factory			9500.		
Salaries office emplo					325000.
indirect labour.			31000		
office supplies					1600
wages packaging workers		42000			
Raw material	38000				
rent factory			14000.		
sales commission promotion				40500	
				97000.	
	197690			494710	

SP-24

Cost Item	Product Cost			Period Cost
	DM	DL	Man Overh	
Material cost	30			
Labour cost		40		
Dep. factory-equip			25,000.	
tax on factory building			6000.	
Advertising cost				60,000.
Sales comission				20.
Salaries for factory mm			45000.	
plant manager			70000	
Shipping cost				8.
Total =	30	40	146000	60028.
	= 146070.			

Fall-20

Cost Item	production cost			selling & distribution Period cost	
	DM	DL	Man Overh	~~Sales Advertising~~	General Admin
Advertising exp				9500	
Factory equip-reath			10250		
Utilities exp			4500.		
Dep on office furniture					7775
Raw material	225 000				
Indirect labour			19750		
Direct labour cost		275 000			
Insurance			5000		5000 (50%)
Sales commission				7500.	
factory supervisor salary			30,000		
Delivery exp				8500.	
Selling admin. Salary				22000	
	225000	275000	69500	47500	12775
Total =	569500			60275	