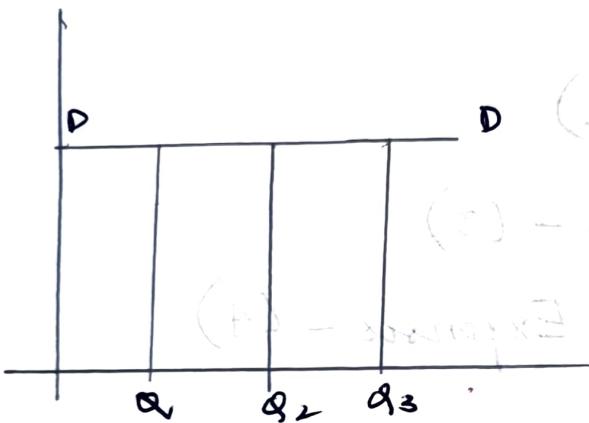


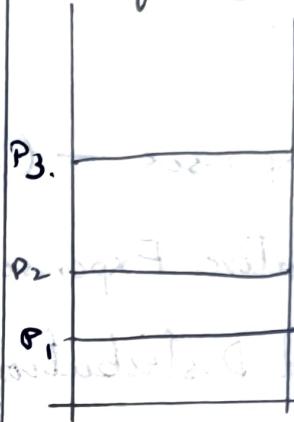
UNIT I Concepts in Economics

[P.D.F]

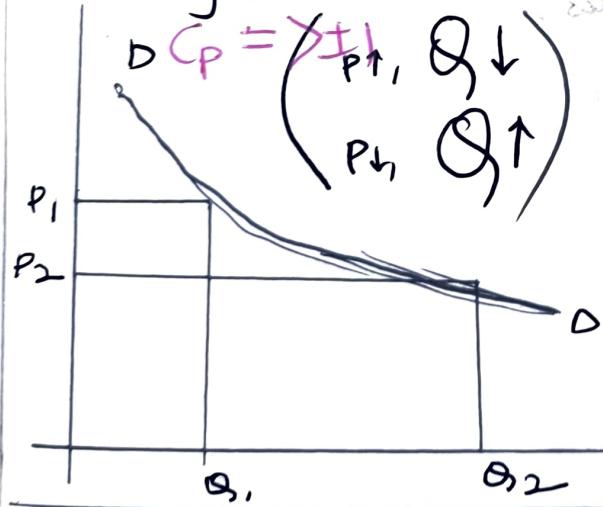
• Perfectly elastic $[C_P = \infty]$



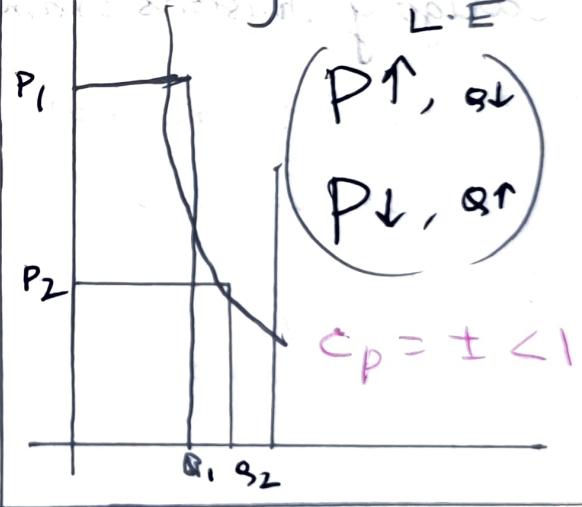
• Perfectly Inelastic $[C_P = 0]$



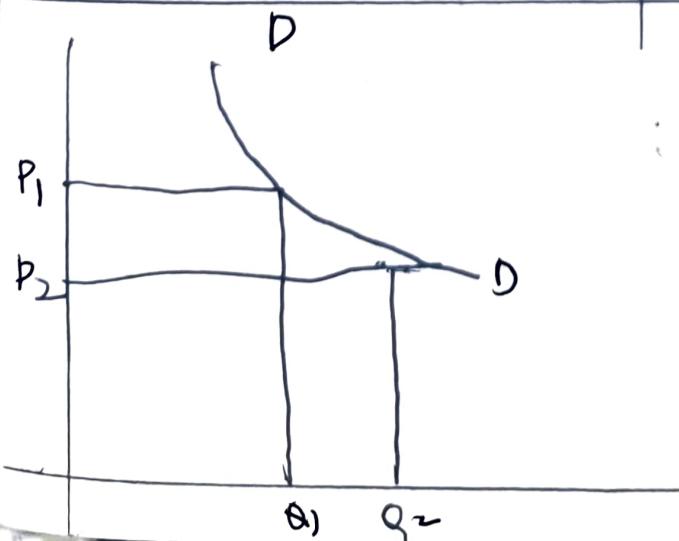
• Relatively elastic ME



• Relatively inelastic LE



• Unitarily elastic $[C_P = \pm 1]$



UNIT 2. Cost Analysis and Profit Planning

★ COST SHEET:

1) Prime Cost (1)

- Direct material Cost
- Direct Employees (Labour) Cost
- Direct Expenses
- + = Prime Cost

2) Factory Expenses - (2)

3) Administrative Expenses - (3)

4) Selling and Distribution Expenses - (4)

★ Category Divisions examples :

- Purchase of raw material
- Carriage Inwards
- Direct wages
- Indirect wages
- Rent rates
- Depreciation on plant and machinery
- Depreciation on office furniture
- Bad debts
- Advertisement
- Carriage outwards
- Lubricants

- Insurance on plants
 - Directors fee
 - Power
 - Rent of showroom
 - Repairs to plant
 - Director Salary
 - Telephone
- 02 ft = advertisement sign on the road
- 02 R.F = showroom exterior door open
- 00 ft = office exterior door open
- 02 ft = two ground floor shop
- 02 ft = advertisement board on the road
- 00 ft = entrance door open
- 02 ft = advertisement board on the road
- 00 ft = entrance door open
- 00 ft = entrance door open

- i) Accounts for Ajanta company for the year end 2022 provides the following:-
- i) Stock closing on 31/12/22 - 628,00 DM
 - ii) Stock of material on 1/1/22 - 48,000 DM
 - iii) Material purchased - 1,85,000 DM
 - iv) Drawing office Salaries - 6,500 FC
 - v) Carriage and cartage outwards - 4,300 SE
 - vi) Carriage and cartage inwards - 7,150 DM
 - vii) Bad debts written off - 6,500 SE
 - viii) Repairs of plant machinery and tools - 4,450 FC
 - ix) Rent, rates, taxes and insurance for factory - 8,500 FC
 - x) Advertisement expenses - 2,900 SE
 - xi) Travellers salaries and commission - 7,700 SE
 - xii) Productive Wages (also called as direct wages/direct labour) - 1,26,000 DL
 - xiii) Depreciation on office furniture - 300 OE
 - xiv) Director's Fee - 6,000 OE
 - xv) Gas and water for factory - 1,200 FC
 - xvi) Gas and water for office - 400 OE FC
 - xvii) Manager's Salary - 10,000 → $\begin{pmatrix} \frac{3}{4} \text{ factory} \\ \frac{1}{4} \text{ office} \\ \text{OE} \end{pmatrix}$

+ viii) General Expenses - 3,400 OE
 - 4,61,000

+ vii) Sales

+ vi) Counting House Salaries - 12,600 OE

Statement of Cost of Ajanta Ltd. for the period ending 31.12.2022.

Particulars	Amount (in Rs)	Amount (in Rs)
Opening stock of material	48,000	
Add: Material Purchased	1,85,000	
Carriage & cartage inwards	7,150	
Less: Closing stock of material	<u>62,800</u>	
Raw materials consumed	1,77,350	
Add: Productive Wages	1,26,000	
Prime Cost		3,03,350
Add: Factory & Work expenses / Overheads ($10,000 \times \frac{3}{4}$)		
Factory Manager's salary	7,500	
Repairs of plant, machinery & tools	4,450	
Rent, rates, taxes & insurance	8,500	
Gas and Water	1,200	
Drawing Office Salary	6,500	
Depreciation on plant and machinery	<u>6,500</u>	

~~Factory or Cost~~

Factory

expenses

34,650

Factory Cost

3,38,000

Add: Administrative / Office Expenses / overheads

Counting house salaries 12,600

Rents, rates, taxes and insurance 2,000

Depreciation on furniture 300

Directors' fee 6,000

Gas and Water 400

Office manager's salary ($10000 \times 1/4$) 2,500

General Expenses 3,400

Office Cost

Office expenses

27,200

Cost of production

36,5200

Add: Selling and distribution expenses

Travelling expenses 2,100

Advertisement expenses 2,900

Carriage and cartage outwards 4,300

Bad debts written off 6,500

Travellers' salaries and commission 7,700

23,500

Cost of Sales

3,88,700

Profit (Sales - Cost of Sales)

72,300

Sales

4,61,000

BLUEPRINT FOR COST SHEET

PARTICULARS	Amt (in Rs)	Amt (in Rs)
Direct Material		
Direct Labour		
Direct Expenses		
PRIME COST		
(+) Factory Overheads		
FACTORY COST / WORK COST		
(+) Office and administrative Expenses		
COST OF PRODUCTION		
(+) Opening Stock of Finished Goods		
(-) Closing Stock of Finished Goods		
COST OF GOODS SOLD		
(+) Selling & Distribution Overheads		
COST OF SALES		
(+) Profit		
SALES		

How table works :

$$\text{Prime Cost} + \text{Factory Expenses} = \text{FACTORY COST}$$

$$\text{Factory Cost} + \text{Office Expenses} = \text{Cost of production}$$

$$\text{Cost of production} + \text{Opening stock of finished goods} - \text{Closing stock of finished goods} = \text{Cost of goods sold}$$

$$\text{Cost of goods sold} + \text{Selling Expenses} = \text{Cost of Sales}$$

$$\text{Cost of sales} + \text{Profit} = \text{Sales}$$

2) Prepare a cost sheet to show the total cost of production of cost per unit of goods manufactured by a company for Sept 2023 and also calculate cost of sales. (We're calculating CS for 1 month)

i)	Stock of material on 1/9/23	- 3000 PM
ii)	Material purchased	- 28,000 DM
iii)	Stock on 30/9/23	- 4,500 DM
iv)	<u>Manufacturing Wages</u>	- 7,000 DL
v)	Loss on sale of part of plant	- 300 X
vi)	Factory rent and rates	- 3000 FC
vii)	Other rent	- 500 OE
viii)	General expenses	- 400 OE
ix)	Advertisement expenses	- 600 SE
x)	Income tax paid	- 2000 X
xi)	Depreciation on plant	- 1500 FC
xii)	# of units purchased during September	- <u>3000</u> Total Units
xiii)	Stock of finished goods on 1 st Sept and 30 th Sept respectively	- 200 $\{$ 400 units $200 + 200 = 400$
xiv)	Total Cost of <u>units on hand</u> on 1 st Sept	- 2,800 $3000 - 200 = 2800$

(Finished goods)
opening stock

Particulars	Amount (in Rs)	Total amount (in Rs)	Per unit cost (in Rs)
Opening stock of raw materials	3000		
Add: Material purchased	<u>28,000</u> 31,000		
Less: Closing stock of raw materials	4,500		$(26500/3000)$
Raw material consumed	26,500		8.83
Add: Manufacturing wages	7000		<u>2.33</u>
		33500	11.16
Prime Cost			
Add: Factory expenses	3,000		
Factory Rent & Rates			
Depreciation on plant	1,500		
Factory on cont	4,500		1.50
Factory Cost	38000		12.66
Add: Office Expenses			
Other rents	500		
General expenses	400		
	900		0.30
Cost of production	38900		12.96
Add: Opening stock of finished goods	2,800		
	41,700		
Closed stock of finished goods	5,184		

Add: Selling and Distribution expenses

Advertisement 600

Cost of Sales 37116 13.26

Profit -

Sales (not given)

→ Advertisement is only done for sold goods. We start with 200 units. During Sept, 3000 are produced. At the end of the month, 400 are remaining. So, advertisement is done for $(200 + 3000 - 400 = 2800)$ units. It is done for 2800 units.

3) Calculate profit from following:

i) Cost of production - 11,000 U - 44,000 ₹

ii) Selling expenses per unit - 0.4 or 40 paise

iii) Sales - 9000 U - 54,000 rupees.

→ You need to realise that sales only happened for 9000U. Unsold are 2000U ($11,000U - 9000U = 2000U$). Selling expenses are only for sold goods.

Particulars	Amt (in ₹)	Total amt (in ₹)	Per unit cost
Cost of production		44,000	4
: Closed stock of finished goods	8000		
		<u>36000</u>	
Add: Selling Expenses		<u>3,600</u>	<u>0.40</u>
Cost of Sales		39,600	4.40
Profit		4,400	
Sales: - <i>Establish for Counters, Office</i>		<u>54,000</u>	

Explanation:

→ $\frac{44000}{11,000} = 4$, Closed stock of finished goods $= 2000U \times 4 \text{ ₹} = 8000 \text{ ₹}$

CSOFG always takes R.P.U of COP

→ Selling expenses are always calculated for goods sold and sold are 9000U (Basically,

$$\begin{aligned} & \text{COP units} - \text{CSOFG} \\ & 11,000U - 2000U \\ & = 9000U \end{aligned}$$

Given per unit cost of selling expenses = 0.4 ₹

$$\boxed{\text{Per unit cost} \times \text{No. of units} = \text{Total amount}}$$

$$0.4 \times 9000 = 3600 \text{ ₹}$$

4) Following information has been obtained from the records of a manufacturing company (T.B, Example 8)	<u>1-1-1998</u>	<u>31-12-1998</u>
i) Stock of Raw Material	40,000	50,000 DM
ii) Stock of finished goods	1,00,000	1,50,000
iii) Stock of Work-in progress	10,000	14,000
iv) Indirect Labour - 50,000 FC		
v) Lubricants - 10,000 FC		
vi) Insurance on Plant ^{factory} - 3,000 FC		
vii) Purchase of raw materials - 4,00,000 DM		
viii) Sales Commission - 60,000 SE		
ix) Salaries of Salesmen - 1,00,000 SE		
x) Carriage Outward - 20,000 SE		
xii) Administration expenses - 1,00,000 DE		
xii) Power - 30,000 FC		
xiii) Direct Labour - 3,00,000 DL		
xiv) Depreciation on Machinery - 50,000 FC		
xv) Factory Rent - 60,000 FC		
xvi) Property tax on factory building - 11,000 FC		
xvii) Sales - 12,00,000		

Find:

- a) Cost of raw materials consumed
- b) Prime Cost

- c) Total manufacturing Cost
- d) Factory Manufacturing Cost
- e) Cost of goods sold
- f) COP, Profit

* Statement of cost for period ending 31/12/98

Particulars	Amt (in rs)	Total amt (in ₹)
Opening stock of raw mat	40,000	
Add: Purchase of raw mat	<u>4,00,000</u>	
	4,40,000	
Less: Closing stock of mat	<u>50,000</u>	
Raw material Consumed	3,90,000	
Add: Direct Labour	<u>3,00,000</u>	
	6,90,000	
<u>Add: Factory Expenses</u>		
Indirect Labour	50,000	
Lubricants	10,000	
Insurance on Plant	3,000	
Power	30,000	
Depreciation on Machinery	50,000	
Factory Rent	60,000	
Property tax on factory building	<u>11,000</u>	
	2,14,000	

Factory on Cost

2,14,000

Total Manufacturing Cost

9,04,000

Add: Opening stock of work in progress 10,000

Less: Closing stock of work-in progress 14,000

~~-4,000~~

Factory Manufacturing Cost

9,00,000

Add: Office Expenses

Administrative expenses 1,00,000

Office Cost

1,00,000

Cost of production

1,00,00,000

Add: Opening stock of finished goods 1,00,000

Less: Closed stock of finished goods 1,50,000

Cost of goods sold

9,50,000

Add: Sales and Distribution expenses

Sales Commission

60,000

Salaries of Salesmen

1,00,000

Carriage outward

20,000

1,80,000

Cost of Sales

11,30,000

Profit

70,000

Sales

12,00,000

IMP:

$$\text{Prime Cost} + \text{Factory overhead} = \frac{\text{Factory Cost}}{\text{Total Manufacturing Cost}}$$

$$\rightarrow \text{Total Manufacturing Cost} \\ + \text{Opening stock of work-in-progress} = \text{Factory Manufacturing Cost} \\ - \text{Closing stock of W.I.P}$$

BREAK-EVEN POINT:

[For this topic, marks will be allotted based on steps.
For whatever value is not given directly in question,
you need to write down in steps]

Categories of Costs:

- All the expenses put to produce a product is called cost.
- (i) **Fixed Cost:** Doesn't change regardless of business activity. Ex: Rents paid.
- (ii) **Variable Cost:** Varies with business activity
Ex: T-shirts cloth needed
- (iii) **Semi-variable/Mixed Cost:** Part of cost stays consistent and other part of cost fluctuates with business.

Ex: 100 calls per day 1000 £ bill. If exceeded, £1 for extra call.

FORMULAE: (ONLINE)

$$1) P/V \text{ (Profit/volume ratio)} = \frac{\text{Contribution}}{\text{Sales}} \times 100\%.$$

$$2) \text{B.E.P (unit)} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}}$$

$$3) \text{B.E.P (rupees)} = \frac{\text{Fixed Cost}}{P/V}$$

$$4) \text{Require of sales (unit)} = \frac{\text{Fixed Cost} + \text{Profit}}{C.P.U}$$

$$5) \text{Require of sales (rupees)} = \frac{\text{Fixed Cost} + \text{Profit}}{P/V}$$

$$6) \text{Margin of Safety} = (\text{Actual Sales}) - (\text{Break even Sales})$$

$$7) \text{Profit} = (\text{Margin of safety}) \times (P/V)$$

$$8) P/V \% = \text{Contribution \% wrt sales}$$

$$1) \text{ Variable Cost (per unit)} = \frac{\text{Change in cost}}{\text{Change in unit}}$$

$$10) P/V = \frac{\text{Change in profit}}{\text{Change in sales}} \times 100\%$$

$$\text{Break Even Sales} = (B - E \cdot V)(\text{Sales P})$$

1) Selling price per unit	- 30 rupees
Variable Cost per unit	- 10 rupees
Fixed Cost	- 1,00,000 rupees

Calculate break even point

Sol) Contribution per unit = Selling price per unit
 -
 Variable Cost per unit
 = $30 - 10 = 20$ rupees

Break-even point = $\frac{\text{Fixed Cost}}{\text{Contribution per unit}}$
 = $\frac{1,00,000}{20} = 5,000$ units

• Cross-check your answer like below:

Break-Even
 Sales = $(\text{Break-even point}) \times (\text{Selling price per unit})$
 $(5,000 \times 30)$ 1,50,000

Less: Variable Cost = $(\text{Break-even point}) \times (\text{Variable cost per unit})$
 $(5,000 \times 20)$ 50,000

Contribution 1,00,000
 Less: Fixed Cost 1,00,000

 No profit/no loss Should be zero
 as we took break-even sales here technically

3) Question 2.1 (PPT)

Sol)

(i) Variable cost per unit = (Raw material cost per unit)
+

(Labour charges per unit)
+

(Variable overheads per unit)

$$= 10 + 10 + 5$$

$$= 25 \text{ rupees}$$

(ii) Fixed Cost per unit = (Fixed Manufacturing Overhead)

+

(Fixed Selling Cost)

$$= 1,50,000 + 50,000$$

$$= 2,00,000 \text{ rupees}$$

(iii) Contribution per unit = (Selling price per unit)

- (Variable Cost per unit)

$$= 30 - 25$$

$$= 5 \text{ rupees}$$

(iv) Break-even point = $\frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{2,00,000}{5}$

$$= 40,000 \text{ units}$$

Quesiton 3.1 (PPT)

i) Variable Cost per unit = (Raw material cost per unit)
+ (Labour charges per unit)
+ (Variable overheads per unit)

$$\begin{aligned} &= 25 + 10 + 15 \\ &= 50 \text{ rupees.} \end{aligned}$$

ii) ~~Fixed Cost~~ Variable Cost = (Fixed Manufacturing Overheads)
+ (Fixed Selling Overheads)

$$\begin{aligned} &= 2,00,000 + 50,000 \\ &= 2,50,000 \text{ rupees} \end{aligned}$$

iii) Contribution per unit = (Selling price per unit)
- (Variable cost per unit)

$$= 100 - 50$$

$$= 50 \text{ rupees}$$

iv) Break-even point = $\frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{2,50,000}{50}$

$$= 5,000 \text{ units}$$

5) Question 4.1 (PPT)

i) Fixed Cost = (Fixed Manufacturing Cost) +
(Fixed Selling Cost)

$$= 88,000 + 1,22,000$$

$$= 2,10,000 \text{ rupees}$$

ii) Contribution per unit = (Selling price per unit)

(Variable price per unit)

$$= 66 - 22$$

$$= 44 \text{ rupees}$$

iii) Break-even point = $\frac{\text{Fixed Cost}}{\text{Contribution per unit}}$

$$= \frac{2,10,000}{44}$$

$$= 4773 \text{ units}$$

iv) Sales to earn desired profit = $\frac{\text{Fixed cost} + \text{Desired profit}}{\text{Contribution per unit}}$

$$= \frac{2,10,000 + 3,500}{44}$$

$$= 4852 \text{ units}$$

v) New fixed Cost = Fixed Cost - 10,000
= 2,10,000 - 10,000

= 2,00,000 rupees

vi) New Break-Even point = $\frac{\text{New Fixed Cost}}{\text{Contribution per unit}}$

$$= \frac{2,00,000}{44}$$
$$= 4545 \text{ units}$$

6) Selling price per unit 60 rupees, variable cost per unit 30 rupees, fixed cost 2 lakhs. Calculate contribution per unit, break even point, sales to earn a profit of 10,000, new break even point if selling price increases by 10%. & profit if sales are 20% above break even point, break even sale in rupees.

Sol) i) Contribution per unit = $\frac{(\text{Selling price per unit})}{(\text{Variable Cost per unit})}$

$$= 60 - 30$$
$$= 30 \text{ rupees}$$

ii) Break-even point = $\frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{2,00,000}{30}$

$$= 6667 \text{ units}$$

$$\text{iii) Sales to earn desired profit} = \frac{\text{Fixed Cost} + \text{Desired profit}}{\text{Contribution per unit}}$$

$$= \frac{2,00,000 + 10,000}{30}$$

$$= 7000 \text{ units}$$

$$\text{iv) New Selling price} = \text{Old selling price} + 6$$

$$= 60 + 6$$

$$= 66 \text{ rupees}$$

$$\text{v) New contribution per unit} = (\text{New selling price per unit}) - \text{Variable Cost per unit}$$

$$= 66 - 30$$

$$= 36 \text{ rupees}$$

$$\text{vi) New Break even point} = \frac{\text{Fixed Cost}}{\text{New Contribution per unit}}$$

$$= \frac{2,00,000}{36}$$

$$= 5556 \text{ units}$$

$$\text{vii) Break-even sales} = (\text{Break-even point}) \times (\text{Selling price per unit})$$

$$= (6667 \times 60)$$

$$= 4,00,020 \text{ rupees}$$

viii) Sales = Break even units + 20% of break-even units

$$= 6667 + 20\% \text{ of } 6667$$

$$= 8000 \text{ units}$$

ix) $(S.P \times \frac{\text{total no. of sales units}}{\text{Total units}})$

$$\text{Sales} = (8000 \times 60)$$

$$\text{Less: Variable Cost} = (8000 \times 30)$$

Contribution	$8000 \times 30 = 2,40,000$
Less: Fixed Cost	$2,40,000 - 2,00,000 = 40,000$

Profit = Total sales - Total variable cost - Total fixed cost

* CATEGORY - II (When info is given for total output)

i) $P/V = \frac{\text{Contribution}}{\text{Sales}} \times 100\%$

ii) Break-even point (in rupees) = $\frac{\text{Fixed Cost}}{P/V \text{ ratio}}$

iii) Sales to earn desired profit = $\frac{\text{Fixed Cost} + \text{Desired profit}}{P/V \text{ ratio}}$

$$\text{iv) Margin of safety} = (\text{Actual Sales}) - \left(\begin{array}{l} \text{Break-even} \\ \text{Sales} \end{array} \right)$$

$$\text{v) Margin of safety} = \frac{\text{Profit}}{\text{P/V ratio}}$$

$$\text{vi) Profit} = (\text{Margin of safety}) \times (\text{P/V ratio})$$

$$\text{i) Sales} = 12,00,000 \text{ rupees}$$

$$\text{Variable Cost} = 6,00,000 \text{ rupees}$$

$$\text{Fixed Cost} = 3,00,000 \text{ rupees}$$

Calculate P/V ratio, break-even point, sales to earn a profit of 20,000 & margin of safety (Sd)

$$\text{i) Contribution} = \frac{\text{Sales} - \text{Variable Cost}}{= 12,00,000 - 6,00,000} \\ = 6,00,000 \text{ rupees}$$

$$\text{ii) P/V ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100\% \\ = \frac{6,00,000}{12,00,000} \times 100\% \\ = 50\%$$

iii) Break Even point = $\frac{\text{Fixed Cost}}{\text{P/V ratio}} = \frac{3,00,000}{50/100}$
 $= 6,00,000 \text{ rupees}$

iv) Sales to earn desired profit = $\frac{\text{Fixed Cost} + \text{Desired profit}}{\text{P/V ratio}}$
 $= \frac{3,00,000 + 20,000}{50/100}$
 $= 6,40,000 \text{ rupees}$

* CATEGORY-III [When info is given for periods]

	2020	2021
Sales	2,00,000	3,00,000
Profit	50,000	75,000

Calculate P/V ratio, BEP, MOS, Fixed cost, Variable cost, sales to earn a desired profit of 24,000

Sol) i) Change in profit = $75,000 - 50,000$
 $= 25,000 \text{ rupees}$

ii) Change in sales = $3,00,000 - 2,00,000 = 1,00,000 \text{ rupees}$

iii) P/V ratio = $\frac{\text{Change in profit}}{\text{Change in sales}} \times 100 = \frac{25,000}{1,00,000} \times 100$
 $= 25\%$

iv) Margin of Safety = $\frac{\text{Profit}}{\text{P/V ratio}}$

$$2020 : \frac{\text{Profit}}{\text{P/V ratio}} = \frac{50,000}{25/100} = 2,00,000 \text{ rupees}$$

$$2021 : \frac{\text{Profit}}{\text{P/V ratio}} = \frac{75,000}{25/100} = 3,00,000 \text{ rupees}$$

v) Break-even sales = $(\text{Actual Sales}) - (\text{Margin of Safety})$

$$2020 : 2,00,000 - 2,00,000 = 0 \text{ rupees}$$

$$2021 : 3,00,000 - 3,00,000 = 0 \text{ rupees}$$

vi) Fixed Cost = 0 rupees

vii) Variable Cost = Sales - Fixed Cost \pm Profit/Loss

(I think,

$$\text{Sales} - V.C = \text{Contribution}$$

$$\text{Sales} - v.c = (\text{Profit}/\text{Loss} + F.C)$$

$$\boxed{\text{Sales} - F.C \pm \text{Profit}/\text{Loss} = V.C}$$

? $2022 : 2,00,000 - 0 - 50,000 = 1,50,000 \text{ rupees}$

$$2023 : 3,00,000 - 75,000 = 2,25,000 \text{ rupees}$$

viii) Sales to earn desired profit = $\frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V ratio}}$

$$= \frac{0 + 24,000}{25/100}$$
$$= 96,000 \text{ rupees}$$

* Applications of Break-Even Analysis: (BEA)

- i) Make or buy ii) Continue or drop
- iii) Cost Control
- iv) Product Mix

* BEA Assumptions:

- i) All costs can be categorized into fixed and variable.
- ii) No stock i.e. whatever produced is sold.
- iii) Variable costs are considered as period costs.
- iv) Fixed costs are considered as period cost
-) Selling price per unit and variable cost per unit remains same in market.

* Merits of BEA:

- i) Simple to calculate
- ii) Helps in decision making process
- iii) Helps in arriving at minimum sales

* Demerits of BEA:

- i) Applicable for individual products
- ii) It doesn't suggest any remedy or solution. It is you who decides at the end.

- Types of Costs :
- i) Opportunity Cost
- ii) Direct and Indirect Cost
- iii) Controllable and Non-Controllable Cost
- iv) Explicit and Implicit Cost
- v) Avoidable and Non-Avoidable Cost
- vi) Historical, Present and Future Cost
- vii) Sunk and replacement Cost
- viii) Fixed, Variable & Semi-Variable
- ix) Total and average cost
- x) Incremental/Differential Cost and Marginal Cost
- xi) Urgent and Postponable Cost

(i) Opportunity Cost :

- Used for any investment decision
- It is the cost of the second best alternative foregone.

(ii) Direct and Indirect Cost :

- Direct costs are those which is required to make the product ready.
- Indirect costs are those costs that are required after the product is ready.

(iii) Controllable and Non-controllable:

- Controllable is when you can reduce expenditure with your effort.

Ex: Electricity Bills

- Non-Controllable is when you can't reduce expenditure with your effort.

Ex: Petrol/Fuel prices.

(iv) Explicit and Implicit:

- Explicit / Out of pocket / Actual / Real Cost is what you pay in exchange for goods.
- Implicit cost is a self owned factors cost i.e. it is an implicit cost.

Ex: You own a room & take tutorials. You collect 10,000 rupees from students but your income will not be 10,000 rupees. You have to deduct room rent. That rent is implicit cost.

(v) Avoidable and Unavoidable:

- Avoidable costs are costs you can do without but unavoidable is costs you cannot do without.

(vi) Historical, Present and Future costs:

- Historical Costs - money spent till now
- Present Costs - money spending now

• Future Cost - money that you will spend in future.

(ii) Sunk and replacement Cost:

- Sunk cost : Once incurred, they're gone
- Replacement Cost : Extra amount that you spend after replacing old one with a new one is called replacement cost.

(viii) Fixed, Variable and Semi-Variable Costs :

- Fixed Cost : Doesn't change regardless of business activity.
Ex : Rents paid
- Variable Cost : Varies with what business demands.
Ex : Cloth needed for orders varies.
- Semi-variable cost : Part of cost stays consistent and the other part fluctuates with business.
Ex : 100 calls per day $\text{₹}100$ Bill.
If exceeded, $\text{₹}1$ for extra call.

(ix) Total and Average Cost :

- Total Cost : Total Cost spent for manufacturing a product.
(Total Cost = Variable Cost + Fixed Cost)

- Average Cost : Cost spent per unit or cost spent to produce one unit.

(x) Incremental / and Marginal : Differential

100 U — 10,000 Rs

105 U — 10,200 Rs

I - 200

$$M = 40 \left(\frac{200}{50} \right) \rightarrow \text{per unit}$$

- Incremental / Differential Cost : It is the increase in cost for a specific increase in units.

Marginal Cost : It is the increase in cost per unit.

(xi) Urgent and Postponable :

- Urgent Cost : Have to spend right away
- Postponable Cost : Can postpone the expenditure

★ COSTING :

→ Costing is a technique to ascertain the cost.

PRACTICE QUESTIONS:

1) Calculate BEP, sales to earn a profit of 20,000, profit if sales are 10% above break even & new break even sales if variable cost decreases by 10%. Selling price per unit is 50Rs, variable cost per unit is ₹ 30, Fixed Cost is 1,00,000 rupees.

$$\text{Sol) (i) Contribution per unit} = \frac{(\text{Sales per unit}) - (\text{Variable cost per unit})}{}$$

$$= 50 - 30 \\ \text{--- subtract } \\ = 20 \text{ rupees}$$

$$\text{(ii) Break even point (units)} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}}$$

$$= \frac{1,00,000}{20}$$

$$= 5,000 \text{ units}$$

$$\text{(iii) New variable Cost per unit} = \left(\frac{\text{Variable Cost per unit}}{} \right) - 10 = 30 - 10 \\ = 20 \text{ rupees}$$

$$\text{(iv) New Contribution per unit} = \left(\text{Sales per unit} \right) - \left(\text{New Variable Cost per unit} \right)$$

$$= 50 - 20 \\ = 30 \text{ rupees}$$

$$(v) \text{ New Break even point} = \frac{\text{Fixed Cost}}{\text{New Contribution per unit}}$$

$$= \frac{1,00,000}{30}$$

$$= 3333 \text{ units}$$

$$(vi) \text{ New Break even sales} = (\text{New Break even point}) \times (\text{Selling price per unit})$$

$$= 3333 \times 50$$

$$= 1,66,650 \text{ rupees}$$

$$(vii) \text{ Sales to earn a profit of } 20,000 = \frac{\text{Fixed Cost} + \text{Desired profit}}{\text{Contribution per unit}}$$

$$= \frac{1,00,000 + 20,000}{20}$$

$$= 6000 \text{ units}$$

(viii) Profit if Sales are 10% above Break even point :

$$\text{Sales} = 5000 + \frac{10}{100} \times 5000$$

$$\text{Sales} = 5500 \text{ units}$$

<u>Sales</u>	(5500×50)	2,75,000
<u>Less: Variable Cost</u>	(5500×30)	1,65,000
<u>Contribution</u>		1,10,000
<u>Less: Fixed Cost</u>		1,00,000
<u>Profit</u>		10,000

2) Direct Material	- 75,000
Direct Labour	- 25,000
Fixed Manf. Cost	- 50,000
Fixed Selling Cost	- 10,000
Sales	- 3,50,000

Calculate P/V ratio, BEP, MOS, Sales to earn a desired profit of 12,000.

$$\begin{aligned}
 \text{Sol) (i) Fixed Cost} &= (\text{Fixed Manufacturing Cost}) + \\
 &\quad (\text{Fixed Selling Cost}) \\
 &= 50,000 + 10,000 \\
 &= 60,000 \text{ rupees} \\
 \text{(ii) Variable Cost} &= (\text{Direct Material}) + (\text{Direct Labour}) \\
 &= 75,000 + 25,000 \\
 &= 1,00,000 \text{ rupees}
 \end{aligned}$$

(iii) Contribution = (Sales) - (Variable Cost)

$$= 3,50,000 - 1,00,000$$

$$= 2,50,000 \text{ rupees}$$

(iv) P/V ratio = $\frac{\text{Contribution}}{\text{Sales}} \times 100\%$.

$$= \frac{2,50,000}{3,50,000} \times 100\%$$

$$= 71\% \text{ (rounded off)}$$

//
(v) Margin of Safety = (Actual Sales) - (Break-Even Sales) //

(v) Break-Even point = $\frac{\text{Fixed Cost}}{\text{P/V ratio}} = \frac{60,000}{71/100}$

$$= 84,507 \text{ rupees}$$

(vi) Margin of Safety = (Actual Sales) - (Break Even Sales)

$$= 3,50,000 - 84,507$$

$$= 2,65,493 \text{ rupees}$$

(vii) Sales to earn a profit of 12,000 = $\frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution}}$

$$= \frac{60,000 + 12,000}{2,50,000} =$$

UNIT III

* Definition of Accounting:

According to American Institute of certified public chartered accountants, "Accounting is the art of recording, classifying and summarising the events which import atleast one of financial character and analysing and interpreting the results thereof".

- ① recording (writing)
 - ② classifying
 - ③ summarising
 - ④ analysing and interpreting - problems (UNIT- IV)
-] no problems

- I) Recording (from company P.O.V not student)
- We record (written down) transactions to remember events in chronological order.
 - The book where recording is done is called a journal → book of first entry
 - Recording is done by the company (an artificial juridical body) and not as a share holder of the company or an employee.
- II Law considers company as a person and since company doesn't have legs or hands, law takes a stamp to be valid //

→ Recordings are done in two-fold effects i.e giving out and taking something of equal value.

Receiving end : Debit	→ Double entry system)
Giving end : Credit	

→ Accounts is the language of business. There are 3 types of accounts:

(i) Real account : All properties fall under real account. Properties are bought and sold.

	Cash	Property
Property brought	Given	Received
Property sold	Received	Given

(ii) Personal account : There are 2 types of people

- Natural person (human)
- Artificial person (company, trust)

→ Personal accounts can be applicable for both above. Receiver is debited and giver is credited.

(iii) Nominal accounts (Expenses, Losses, Income & Gain)

→ Nominal accounts debit all expenses and losses, and credit all incomes and gains.

Format of Journal entry for recording:

Date	Particulars	L F	→ Ledge folio (page no)	
			Amt to be debited (Rs)	Amt to be credited (Rs)
2023 Oct 30	Cash a/c Dr	105	500	
	To Chalk	1125		500

$\text{Cash} = R - Dr \text{ (Debit)}$

$\text{Chalk} = G - Cr \text{ (Credit)}$

- Balancing is making the totals equal.
- Trial Accounting - Balance Sheet (Trial Balance)
- Trial balance is a point statement & not period statement.

Point Statement: Trial balance of _____
as an instantaneous

Period Statement : For one whole year.

- Point Statements are accurate at a greater degree but not 100%.
- At the end, a financial statement is released which makes the foundation of everything.

→ In balance sheet, every item has to be categorised as [capital]
[non-receivable]

→ As long as accounts topic runs, you must consider yourself as an ~~artificial~~ ^{shop} person

(i.e company)

Items:
Categorise into Revenue and Capital (R)
Categorise into Liabilities, Asset, Expenditure and Income (L/A/EI)

i) Rent R E

ii) Good Will C A

iii) Carriage Inwards R E

iv) Debtors C ~~A~~ A

v) Creditors C L

vi) Land and Buildings C A

vii) Carriage Inwards R E

viii) Wages R E

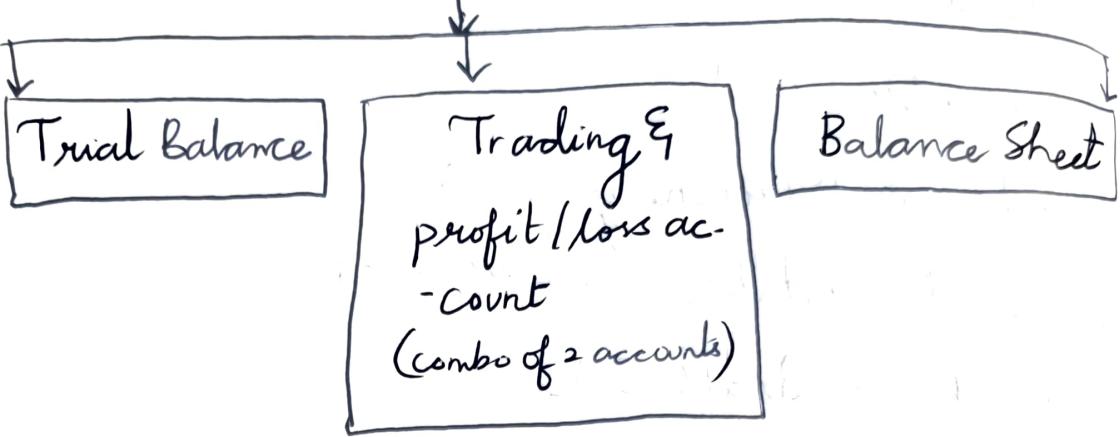
ix) Octroi duty R E → duty that you pay on imported goods
and paid for shipping via land, water or air. Cheaper than import

x) Freight Outwards R E

xi) Printing and Stationery R E

- xii) Postage and Telegram R E
- xiii) Patent rights C A → to claim that this is your product & someone who wants it should pay you.
- xiv) Bad debts C Loss
- xv) Plant and Machinery C A
- xvi) Marketable Securities C A
- xvii) Bank overdraft C L to cover the amt of withdrawal, even in insufficient money, bank allows the account holder to take it known as overdraft.
- xviii) Cash in hand C A
- xix) Cash at bank C A
- xx) Capital C L
- xxi) Discount allowed R E
- xxii) Discount received R Income
- xxiii) Salesmen salary R E
- xxiv) Commission received R Income
- xxv) Rates and taxes R E
- xxvi) Sales R Income
- xxvii) Purchases R E
- All revenue items go into trading and profit and loss account.
- All capital items go into balance sheet which can further be categorised into assets and liabilities.

Summary :



- Trial statements : as _____ on _____
- Period statements : period ending _____
- RDE -

marks

* BALANCE SHEET: We have left side and right side. Left side is for liabilities & assets are on the right side.

Balance sheet as on _____

Liabilities	Amount (in Rs)	Assets	Amount (in Rs)

- Liabilities - anything payable to company
- Assets - anything that belongs to company or receivable.

Liabilities	Amount (in Rs)	Assets	Amount (in Rs)
Debtors		Good Will	
Creditors		Land & Building	
Capital		Plant & Machinery	

★ RATIO'S: (I) - Profitability Ratios

$$\boxed{\text{Profit/Loss} = \text{Sales} - \text{Cost Price}}$$

→ Sales, C.P and profit are related

* Derivation of formulae: PROFITABILITY RATIOS

$$\frac{\text{Gross Profit}}{\text{Sales}} \times 100$$

for 100% sales, how much would be the net profit.

$$\text{Gross Profit} \times 100 = \text{Sales} \times ?$$

$$? = \frac{\text{Gross profit}}{\text{Sales}} \times 100$$

$$\boxed{\text{Gross Profit Ratio} = \frac{\text{Gross profit}}{\text{Sales}} \times 100}$$

(Q) Trading and profit & loss a/c of Arjun for the year ending 31-3-2022

Dr Particulars	Amount (in rs)	Particulars	Amount (in rs)
To opening stock	25,000	By Sales 6,00,000	
To purchases 2,25,000		Less: Returns 10,000	
<u>Less: Returns 5000</u>			5,90,000
	2,20,000	By closing stock	70,000
To wages	2500		
To custom duties	4100		
To carriage inwards	2900	By gross profit b/d from trading a/c	4,05,500
To gross profit c/d to profit	405500		
	<u>6,60,000</u>	By discount received	1,000
To interest [Financial expense]	22,000		
To discount allowed	1700		4,06,500
To salaries o.	12000		
To insurance o	800		
To Bad debts s	100		
To Rates and taxes o	1800		
To postage telegrams	500		
To audit fee o	1700		
To printing & sta.o	800		
To net profit c/d to Capital a/c	365100		4,06,500

→ Profitability Ratios:

i) Gross profit ratio = $\frac{\text{Gross profit}}{\text{Sales}} \times 100\%$

$$= \frac{4,055,00}{5,90,000} \times 100\%$$

5,90,000

$$= 68.73\%$$

ii) Net profit Ratio = $\frac{\text{Net profit after taxes}}{\text{Sales}} \times 100\%$

$$= \frac{3,651,00}{5,90,000} \times 100\%$$

5,90,000

$$= 61.88\%$$

iii) Operating profit ratio = $\frac{\text{Earnings before interests & taxes}}{\text{Sales}} \times 100\%$

[Later, now not needed]

iv) Cost of goods sold = Sales - profit
 $= 5,90,000 - 4,05,500$
 $= 184,500 \text{ rupees}$

v) Cost of goods sold ratio = $\frac{\text{Cost of goods sold}}{\text{Sales}} \times 100\%$
 $= \frac{1,84,500}{5,90,000} \times 100\%$
 $= 31.27\%$

vi) Administrative Expenses
 $= 22000 + 12000 + 800 + 1800 + 500 + 1700$
 $\quad \quad \quad \text{Salaries + insurance + Rates & rents + Postage + telegram + audit fee + printing + sta.}$
 $+ 800$
 $\Rightarrow 39,600 - 22,000 = 17,600 \text{ rupees}$

vii) Administrative Expense Ratio = $\frac{\text{Administrative expenses}}{\text{Sales}} \times 100\%$
 $= \frac{17,600}{5,90,000} \times 100\%$
 $= 2.98\%$

viii) Selling and distribution expenses = Discount allowed + Bad debts

$$= 1700 + 100$$

$$= 1800 \text{ rupees}$$

ix) Selling and distribution expenses ratio = $\frac{\text{Selling & distribution expenses}}{\text{Sales}} \times 100\%$

$$= \frac{1800}{5,90,000} \times 100\%$$

$$= 0.31\%.$$

NOTE : Interest is a financial expense

II Liquidity Ratios

Current Asset : No deliberate action is needed
current Liability : Becomes payable within one year, anytime

- Bill of Exchange :

Seller Buyer
X Y

→ Document has to be signed by Y and kept by X for the document to be valid.

→ 2 kinds :

Bill receivable - X

Bill payable - Y

→ Accommodation Bill : Agreement b/w 2 parties

- It is a bill, draft where bill of exchange is drawn and accepted for mutual help.
- This bill is for mutual benefit without a trade transaction.
- It doesn't involve a sale or purchase of any goods. & gives financial support to both parties.

Q) Categorise the items below into current assets (C.A) and current liabilities (C.L):

- i) Plant and Machinery
- ii) Bank overdraft - drawing more than what you have by C.L - (6 months to 1 year) an agreement with bankers
- iii) Debtors C.A bankers
- iv) Creditors C.L ✓
- v) Capital
- vi) Loan taken
- vii) Loan given Neither C.A nor C.L
- viii) Good Will
- ix) Patent rights
- x) Cash in hand C.A ✓
- xi) Cash at bank C.A ✓
- xii) Marketable securities
- xiii) Prepaid expenses C.A paid well in advance ✓
- xiv) Closing stock C.A ✓
- xv) Outstanding salaries C.L ✓
- xvi) Bills receivable C.A ✓
- xvii) Bills payable C.L ✓

5. Long Term Sources and Uses of Finance

Capital Budgeting:

Long term investment decisions i.e. whether or not you make a decision to invest for a long term period. [Accept, Reject]

Activity: E - Expense, I - Income

Asset - sl		Asset - sl	
E	I	E	I
Sal: 2l	5l	2l	5l
Dep: 1l		1.5l	
N.t Profit $(5-3)$ $=2l$		$(5-3.5)$ 1.5l	

Depreciation: Reduction ⁱⁿ value of asset due to wear and tear when used -

→ Because of the methodology in calculating depreciation is different, depreciation is different ($1l$, $1.5l$) -

$$\rightarrow \text{Profit} + \text{Depreciation} = \text{Cash}$$

$$\rightarrow \text{Cash Available} = (5-2) = 3 \text{ l} \quad \left. \begin{array}{l} \\ \end{array} \right\} \begin{array}{l} \text{Depreciation is not} \\ \text{added} \end{array}$$

$$(5-2) = 3 \text{ l}$$

- Taxes are laid based on profits of the company
- Depreciation is not taxable.
- How do we calculate depreciation?

i) Asset Value - 100 ~~$\frac{100-0}{2} = 50$~~ ~~M~~ even

(after 2 years) Asset Value - 0 ~~$\frac{100-0}{2} = 50$~~

$$\text{Depreciation Value} = \frac{100-0}{2} = 50$$

ii) Asset Value - 100
 Scrap Value - 20 ~~Scrap ≈ Salvage~~
 Asset Value - 0
 (after 2 years)

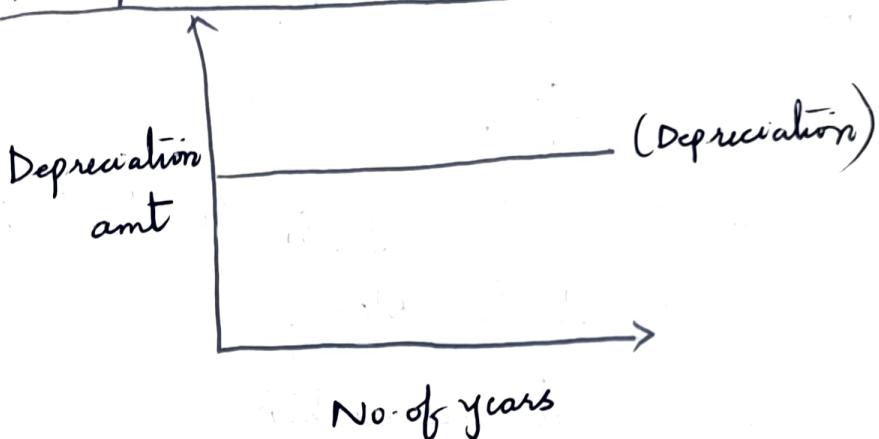
$$\text{Depreciation Value} = \frac{100-0-20}{2} = 40$$

iii) Depreciation Formula : (SLM)

$\frac{\text{Depreciation}}{\text{Value}} = \frac{\text{Cost of asset} - \text{Salvage value}}{\text{Estimated life of asset}}$

Graph b/w (No. of years vs Depreciation amt)

STRAIGHT LINE METHOD



Budgeting
Capital Scheduling :

a) Cost of asset - 1,00,000

Salvage - 10,000

Additional Working Capital - 6,000

Cost of Capital - 12%.

Tax Rate - 40%.

Estimated life - 3 years

Years	CFBT	Dep	NPBT
1	40,000	30,000	10,000
2	60,000	30,000	30,000
3	1,00,000	30,000	70,000

Tax	NPAT	CFAT	
4,000	6,000	36,000	$NPBT = CFBT - Dcf$
12,000	18,000	48,000	$NPAT = NPBT - Tax$
28,000	42,000	72,000	$CFAT = Dep + NPAT$

CFBT - Cash flow before tax

NPBT - Net profit before tax

NPAT - Net profit after tax

CFAT - Cash flow after tax

a) Initial Investment

Salvage Value - 10,000

Life - 2 years

CFBT - 70,000 and 1,00,000 for year 1
and year 2 respectively

Sol) Since tax is not given, we always assume it to be 50%.

Years	CFBT	Dep	NPBT	Tax	NPAT	CFAT
1	70,000	30,000	40,000	20,000	20,000	50,000
2	1,00,000	30,000	70,000	35,000	35,000	65,000

[6 Marks] ★★

* Classify the below NPBT, NPAT, CFBT, CFAT:

- Returns before depreciation and before tax
- Returns after depreciation and after tax
- Returns before depreciation and after tax
- Returns after depreciation and before tax
- Earnings after tax — NPAT
- Earnings before tax — NPBT
- Cash inflows — CFAT
- Earnings before depreciation and before tax
- Earnings after depreciation and after tax
- Earnings before depreciation and after tax
- Earnings after depreciation and before tax

CFBT
NPAT
CFAT
NPBT

NOTE: If nothing is given, you consider it to be after tax.

Don't use additional informations in capital budgeting

Last 4 statements are technically wrong as earnings are profits. But, earnings are given in question paper, so you include and categorize it anyways.

before depreciation — cash
after depreciation — profit

Techniques

1. Traditional / Non-discounted techniques

i) Pay back periods (PBP)

ii) Accounting / Average rate of return (ARR)

2. Discounted cash flow technique

i) Net present value (NPV)

ii) Profitability Index (PI)

iii) Internal Rate of return (IRR)

① TRADITIONAL / NON DISCOUNTED

i) Pay back period (PBP)

Time taken to ~~recover~~ ^{recover} the investment that you made is called pay back period.

Real Cash → flows before taxes

Estimated → flows after taxes

Ex: Initial investment = 1,00,000₹

Estimated cash flow = 25,000₹
per annum

$$PBP = \frac{1,00,000}{25,000} = 4 \text{ years}$$

Formula: $\frac{\text{Initial Investment}}{\text{Estimated Annual Cash Flow After Taxes}}$

$$PBP = \frac{\text{Initial Investment}}{\text{Estimated Annual Cash Flow After Taxes}}$$

Q) Cost of asset - 1,25,000

Salvage value - 25,000

Estimated life - 5 years

Estimated annual cash flow - 36,000
after taxes

Sol) $PBP = \frac{\text{Initial Investment}}{\text{Estimated annual cash flow after taxes}}$

$$PBP = \frac{1,25,000}{36,000}$$

writing full formula will
no shortcuts is imp
units are imp

$$PBP = 3.47 \text{ years}$$

(If pre-determined pay back is not given in the question)

If calculated pay-back period is less than
pre-determined pay-back period, accept the proposal
else reject it.

(If pre-determined pay back is given in the question,
the below statement has to be written)

As calculated pay-back period is less than
pre-determined pay-back period, accept the proposal
else reject it.

ii) Accounting / Average rate of return (ARR)

$$ARR = \frac{\text{Average annual net profit after taxes}}{\text{Average Investment}} \times 100$$

= in %.

$$\text{Average investment} = \frac{1}{2} (\text{Initial Investment} - \text{Salvage Value}) +$$

$$\frac{\text{Salvage Value} + \text{Additional working capital}}{\text{Extra stock}}$$

extra stock which is also an investment so you consider it

COST OF CAPITAL - Expected returns of an investor is called the cost of capital

If ARR is greater than cost of capital then accept the proposal

As ARR is greater than cost of capital then accept the

a) A company proposes to invest £1,20,000 for a period of 3 years expected to fetch £20,000 after 3 years. Extra stocks maintained worth £3,000, cost of capital 8%. The estimated returns after depreciation and before tax is £40,000. Calculate ARR and PBP.

Sol) i) PBP

Assumed tax rate as 50%.

NPBT	Tax (50% of £40,000)	NPAT (£40,000 - £20,000)	CFAT (£20,000 + £33.33K)
£40,000	£20,000	£20,000	£53333.33

$$\rightarrow \text{Dep} = \frac{\text{Initial Investment} / \text{Cost of asset} - \text{Salvage}^V}{\text{Estimated life}}$$

$$\text{Depreciation} = \frac{£1,20,000 - £20,000}{3} = 33,333.33 \text{ rupees}$$

$$\text{PBP} = \frac{\text{Initial Investment}}{\text{Estimated annual cash flow after tax}}$$

$$= \frac{£1,20,000}{£53333.33}$$

$$\text{PBP} = 2.25 \text{ years}$$

As calculated pay-back period is less than pre-determined period, accept the proposal.

ii) ARR

Average Investment = $\frac{1}{2}$ (Initial Investment - Salvage Value) + Salvage Value + Additional Working capital

$$= \frac{1}{2} (1,20,000 + 20,000) + 20,000 + 3,000 \\ = 73,000 \text{ rupees}$$

(NPAT)

$$\text{ARR} = \frac{\text{Average annual net profit after taxes}}{\text{Average Investment}} \times 100$$

$$= \frac{20,000}{73,000} \times 100 \\ = 27.40\%$$

As ARR is greater than cost of capital then proposal is accepted.

* DISCOUNTED CASH FLOW TECHNIQUES:

- i) Net Present Value (NPV) Discount is reduction
- ii) Profitability Index (PI) Reduction in rupees
- iii) Internal Rate of Return (IRR)

i) Net Present Value (NPV):

- Discounted cash flow technique that considers time value of money in evaluating capital investments.
- Basically, you track back to the present value of the profits you would make from the future value of profits by the cost of capital rate.

$$NPV = \sum PVCI - \sum PVCO$$

NPV = Net present value (Profits)

$\sum PVCI$ = Total Present Value of Cash Inflows

$\sum PVCO$ = Total Present Value of Cash Outflows (Investment basically)

(iii)

Profitability Index (PI):

If is the ratio of ^{total} present value of cash inflows to total present value of cash outflow.

$$PI = \frac{\sum PVCI}{\sum PVCO}$$

→ Present value Factor (PVF)

$$P = \frac{1}{(1+k)^n}$$

k = cost of capital

n = year

$$\rightarrow P = \frac{1}{(1+k)^n} < 1$$

It is always less than 1.

- Q) Calculating present value factor (PVF) for 5 years taking cost of capital as 10%. and determining Annuity factor value.

$$Sol) k = 10\% = 0.1$$

$$i) P = \frac{1}{(1+0.1)^1} = 0.909 \quad (\text{for } 1^{\text{st}} \text{ year})$$

$$ii) P = \frac{1}{(1+0.1)^2} = 0.826 \quad (\text{for } 2^{\text{nd}} \text{ year})$$

$$iii) P = \frac{1}{(1+0.1)^3} = 0.751 \quad (\text{for } 3^{\text{rd}} \text{ year})$$

$$iv) P = \frac{1}{(1+0.1)^4} = 0.683 \quad (\text{for } 4^{\text{th}} \text{ year})$$

$$v) P = \frac{1}{(1+0.1)^5} = 0.621 \quad (\text{for } 5^{\text{th}} \text{ year})$$

$$\underline{\sum P = 3.79 - (\text{Annuity Factor Value})}$$

$$\rightarrow \boxed{PVC\text{I} = CFAT \times PVF}$$

PVC_I = Present value of cash inflow

CFAT = Cash flow after tax

PVF = Present Value Factor

$$\rightarrow \boxed{\sum PVC\text{I} = (CFAT \times AF) + (SV \times PVF) + (AWC \times PVF)}$$

$\sum PVC\text{I}$ = Total Present Value of Cash flow

CFAT = Cash flow after tax

AF = Annuity factor value

SV = Salvage value

PVF = Present value factor

AWC = Additional Working Capital

Q) Find NPV when :

Initial Investment - 1,10,000 rupees

Salvage value - 10,000 rupees

Additional Working Capital - 3,000 rupees

Cost of capital - 8%.

^{cash}

The earnings before depreciation and after tax each year is ₹ 49,000 and estimated life is 5 years.

Sol) (Making a table)

$$PVC\text{I} = CFAT \times PVF$$

Year	PVF	CFAT	PVCI
1	0.926	49,000	45374
2	0.857	49,000	41993
3	0.794	49,000	38906
4	0.735	49,000	36015
5	0.681	49,000	33369

you could either calculate them using the formula $PVF = \frac{1}{(1+k)^n}$ if cost of capital is given or if it isn't given also, assume it & do (or) use table.

Setting calc to -3 decimal

$$\sum PVCI = 195657$$

$\rightarrow \sum PVCO$ (Initial Investment) + (Additional Working Capital) rupees

$$= 110,000 + 3,000$$

$$\sum PVCO = 113,000 \text{ rupees}$$

$$\rightarrow NPV = \sum PVCI - \sum PVCO = 195657 - 113,000$$

$$NPV = 82,657 \text{ rupees}$$

As NPV is greater than zero, accept the proposal

$$\rightarrow \text{PI} = \frac{\sum \text{PVCI}}{\sum \text{PVCO}} = \frac{1,95,657}{1,13,000} = 1.80$$

(Profitability Index)

As PI (1.80) > 1, accept the proposal

↪ not sure whether you write the symbol or in words, ask mam once.

(ii) Internal Rate of Return (IRR)

→ IRR represents the discount rate at which the NPV of an investment is zero.

→ It is a discounted cash flow technique which takes into account the time value of money.

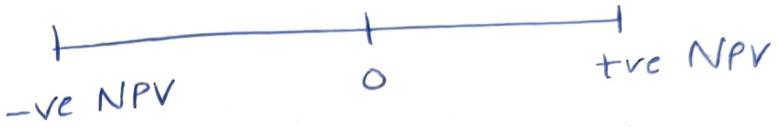
Step I : Calculate Fake PBP (or annuity factor we could conclude)

$$\text{Fake PBP} = \frac{\text{Initial Investment}}{\text{Average Annual Cash Flow After Tax}}$$

Step II : Refer Annuity table against the life of the asset for a value which is slightly higher than fake PBP and a value which is slightly lower than fake PBP over the rates for that particular estimated life year.

Step III: Calculate NPV using the above ratios till a point where NPV is 0 and NPV is $-ve$.

Step IV: We exactly need to find the rate where NPV is 0 , so we interpolate values using



the formula below:

$$\text{IRR} = r - \left[\frac{\sum \text{PVCO} - \sum \text{PVCI}_{\text{Lower}}}{\Delta \sum \text{PVCI}} \times \Delta r \right]$$

where,

$\rightarrow \text{IRR} = \text{Internal Rate of Return}$

$\rightarrow r = \text{Lower rate}$

$\rightarrow \Delta r = \text{Higher rate} - \text{Lower rate}$

$\rightarrow \Delta \sum \text{PVCI} = \sum \text{PVCI}_{\text{Lower}} - \sum \text{PVCI}_{\text{Higher}}$

$\rightarrow \sum \text{PVCI}_{\text{Lower}} = \text{lower value of whichever 2 values}$

$\rightarrow \sum \text{PVCO} = \text{Initial Investment} + \text{Additional Working Capital (if given)}$

Q) Calculate IRR

Initial Investment = 36,000 rupees

CFAT = 11,000 rupees

Estimated life = 5 years

Sol) Step I:

$$\text{Fake PBP} = \frac{\text{Initial Investment}}{\text{Average Annual Cash Flow After Tax}}$$

$$= \frac{36,000}{11,000}$$

$$\text{Fake PBP} = 3.273$$

→ Step II : From the present value of an Annuity of one rupee table, corresponding to year - 5 years:

16% 17%

5 3.274 3.199

(slightly higher
fake pay back
period)

(slightly lower than
fake PBP)

→ Step III :

$$\sum \text{PvCI} = (\text{CFAT} \times \text{AF}) + (\cancel{Sv} \times \cancel{PVF}) + (\cancel{Awct} \times \cancel{PVF})$$

$$@ 16\% - (11,000 \times 3.274) = 36,014 \text{ rupees}$$

$$@ 17\% - (11,000 \times 3.199) = 35,189 \text{ rupees}$$

Step IV:

$$IRR = r - \left[\frac{\sum PVCI - \sum PVCO}{\Delta \sum PVCI} \right] \times \Delta r$$

$$\rightarrow NPV_{(+)} = \sum PVCI - \sum PVCO = 36,014 - 36,000 \\ = 121 \text{ rupees}$$

$$\rightarrow NPV_{(-)} = \sum PVCI - \sum PVCO = 35,189 - 36,000 \\ = -811 \text{ rupees}$$

comes
in
step 3

$$IRR = 16 - \left[\frac{36,000 - 36,014}{(36,014 - 35,189)} \right] \times (17 - 16)$$

$$\boxed{IRR = 16.01\%}$$

If $IRR > \text{capital (k)}$, accept the proposal

If $IRR < \text{capital (k)}$, reject the proposal

a) Initial Investment - 44,000 rupees
 CFAT - 12,000 for 4 years

Calculate IRR

Sol)

Step I:

$$\text{Fake PBP} = \frac{\text{Initial Investment}}{\text{Average annual cash flow after tax}}$$

$$= \frac{44,000}{12,000}$$

$$\text{Fake PBP} = 3.667$$

Step II: Present Value of an Annuity of one Rupee, table:

Year Rate %

4 3% 4%

3.717 3.630

(slightly higher) (slightly lower)

$$\text{Step III: } \sum \text{PVCI} = (\text{CFAT} \times \text{AF}) + (\text{SV} \times \text{PVF}) + (\text{AWF} \times \text{APF})$$

$$@ 3\% - (12,000 \times 3.717) = 44,604 \text{ rupees}$$

$$@ 4\% - (12,000 \times 3.630) = 43,560 \text{ rupees}$$

$$NPV_{(+)} = \sum PVCI - \sum PVCO$$

$$= 44,604 - 44,000$$

$$= 604 \text{ rupees}$$

$$NPV_{(-)} = \sum PVCI - \sum PVCO$$

$$= 43,632 - 44,000$$

$$= -440 \text{ rupees}$$

Step IV:

$$IRR = r - \left[\frac{(\sum PVCO - \sum PVCI)}{\Delta \sum PVCI} \right] \times \Delta r$$

$$= 3 - \left[\frac{44,000 - 43,560}{44,604 - 43,560} \right] \times (4^{-3})$$

$$IRR = 2.579\%$$

[P.T.O]

* Uneven Cash Flows

- The problems solved until now were for Even cash flows.
- Same as Even Cash Flow except for the calculation of PBP and NPV
- For Even Cash Flows, $PBP = \frac{\text{Initial Investment}}{\text{Estimated Annual Cash Flow after tax}}$

Q) Calculate PBP if the initial investment is 1,00,000 rupees.

Year	CFAT
1	20,000
2	40,000
3	60,000

Sol) We make an extra column called the CCFAT
(basically the cumulative Cash Flow After Tax)

Year	CFAT	CCFAT
1	20,000	20,000
2	40,000	60,000
3	60,000	1,20,000

1 year — 60,000

? (x) — 40,000

$x = 0.67$ years

PBP = $2 + 0.67 = 2.67$ years

If PBP < pre-determined period, accept else reject

II = 1,50,000 rupees

Q)

Year	CFAT	CCFAT
1	15,000	15,000
2	25,000	40,000
3	32,000	72,000
4	46,000	1,18,000 ✓
5	57,000	1,75,000 crossed
6	63,000	2,38,000

1 year — 57,000

n year — $(1,50,000 - 1,18,000 = 32,000)$

$x = 0.56$ years

PBP = $4 + 0.56 = 4.56$ years

If PBP < pre-determined period, accept else reject

Q) $\Sigma I = 2,75,000$ rupees, $SV = 25,000$ rupees
not req

Year	CFAT	CCFAT
1	46,000	46,000
2	72,000	1,18,000
3	89,000	2,07,000
4	94,000	3,01,000 + around

$$1 \text{ year} - 94,000$$

$$(A.A. \text{ or } x \text{ years} - (2,75,000 - 2,07,000))$$

$$x = 0.72 \text{ years}$$

$$PBP = 3 + 0.72 = 3.72 \text{ years}$$

Q) Initial Investment - 2,50,000 rupees

Salvage Value - 25,000 rupees

Additional Working Capital (AWC) - 3000 rupees

Years	CFAT	CCFAT
1	1,00,000	1,00,000
2	1,25,000	2,25,000
3	2,50,000	4,75,000
4	3,00,000	7,75,000
5	3,75,000	11,50,000

1 year — ₹ 1,50,000

n years — $(2,50,000 - 2,25,000 = 25,000)$

x = 0.2 year

PBP = 2 + 0.2 = 2.2 years

Q) Cost of Asset = ₹ 2,50,000 rupees
Initial Investment

Salvage Value = 25,000 rupees

Estimated life = 5 years

AWC = 3,000 rupees

k (Cost of Capital) = 10%, NPV = ?

Sd) Since tax is not given, assume it to be 50%

→ NPV = $\sum PVCI - \sum PVCO$

→ $\sum PVCO = II + AWC = 2,50,000 + 3,000 = 2,53,000$ rupees

→ CFAT times PVF @ 10% gives PVCI @ 10%.

→ If NPV is +ve, accept proposal else reject

Year	CFBT	Dep	(CFBT - Dep)	(soi. of NPAT)	(NPBT - Tax)	(Dep + NPAT)	CFAT	PVF @ 10%.	PVCI (NPV + CFAT)
1	1,00,000	45,000	55,000	27,500	27,500	72,500	0.909	65,902.5	
2	1,25,000	45,000	80,000	40,000	40,000	85,000	0.826	70,210	
3	2,50,000	45,000	2,05,000	1,02,500	1,02,500	1,41,500	0.751	110,772.5	
4	3,00,000	45,000	2,55,000	1,27,500	1,27,500	1,72,500	0.683	117,817.5	
5	3,75,000	45,000	3,30,000	1,65,000	1,65,000	2,10,000	0.621	130,410	
									$\sum PVCI = 495112.50$

$$NPV = \sum PVCI - \sum PVCO = 495112.5 - 2,50,000 = 2,45,112.5$$

As $NPV > 0$, accept the proposal