Chapter 2

MATERIAL COST

Past Trends:-

May18	Nov 18	May19	Nov19	Nov20	Jan21	July21	Dec 21	May22
15	10	10	10	10	5	5	10	10

MATERIAL

- **Meaning :**
  - The general meaning of material is all commodities/ physical objects used to make the final product.

- **Types :**
  - **Direct Materials**: Materials, cost of which can be directly attributable to the end product for which it is being used, in an economically feasible way.

  - **Indirect Materials**: Those materials which are not directly attributable to a particular final product.

- **Importance:**
  - Direct Materials constitute a significant part for manufacturing and production of goods. Being an input and a significant cost element, it requires adequate management attention.

VALUATION OF MATERIAL RECEIPTS

Treatment of various items associated with Procurement (Purchase) of material

Item	Treatment
Trade Discount	Trade discount is **deducted** from the purchase price if it is not shown as deduction in the invoice.
Quantity Discount	Like trade discount quantity discount is also shown as deduction from the invoice. It is **deducted** from the purchase price if not shown as deduction.
Cash Discount	Cash discount is not deducted from the purchase price. It is treated as interest and finance charges. It is **ignored**.
Subsidy/ Grant/ Incentive	Any subsidy/ grant/ incentive received from the Government or from other sources **deducted** from the cost of purchase.

Tax Invoice

KKR Limited

Date

Bill to _____

Ship to _____

PO Number _____

#	Product	Qty	Rate	Amt. (₹)
	Chem. A	50 kg	Rs. 90 per kg	4500
	Dis. 10%			450
	Gr. Total			4050

Tax Invoice

KKR Limited

Date

Bill to _____

Ship to _____

PO Number _____

#	Product	Qty	Rate	Amt. (₹)
	Chem. B	50 kg	Rs. 90 /kg	4500
	Gr. Total			4500
	10% Discount applicable.			

Tax Invoice

KKR Limited

Date

Bill to _____

Ship to _____

PO Number _____

#	Product	Qty	Rate	Amt (₹)
	Chem. C	50 kg	Rs.90 Per kg	4500
	Dis. 10%			450
	Gr. Total			4050

3% further discount is applicable if payment within 3 days of delivery.

Tax Invoice

OLA Scooters Pvt. Ltd.

Date

Bill to _____

Ship to _____

PO Number _____

#	Product	Qty.	Rate	Amt. (₹)
	Ola S1	1	80000	80,000
	Subsidy 20%			16,000
	Gr. Total			64,000

Duties & Taxes

Item	Treatment
Road tax / Toll Tax	Road tax/ Toll tax if **paid by the buyer** then it is included with the cost of purchase.
G.S.T	▪ It is **excluded** from the cost of purchase if credit for the same is available. ▪ If questions is silent, assume credit is available
Basic Custom Duty	Basic Custom duty is paid on import of goods from outside India. It is **added** with the purchase cost as credit is not available.

Example 1

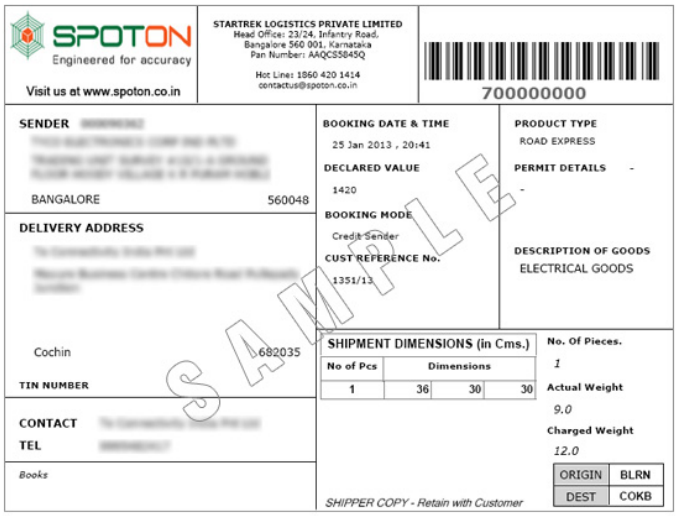
Particular	Amount
Purchase Value	5,00,000
Less : Trade Discount	10,000
Sub Total	4,90,000
Add: CGST 6%	29,400
Add: SGST 6%	29,400
Grand Total	5,48,800
Less : Cash Discount 3%	16,464
Net Payable	5,32,336

Penalty & Charges

Item	Treatment
Demurrage	▪ Demurrage is a penalty imposed by the transporter for **delay** in **unloading** or **offloading** of materials.
	▪ It is an abnormal cost and **not included** with cost of purchase.
Detention Charges / Fine	▪ Detention charges/ fines are imposed for **non-compliance** of **rule or law** by any statutory authority.
	▪ It is an abnormal cost and **not included** with cost of purchase
Penalty	Penalty of any type **is not included** with the cost of purchase.

Commission, Insurance & Freight

Item	Treatment
Insurance Charges	Insurance charges are paid for protecting goods during transit. It is **added** with the cost of purchase.
Commission Or brokerage	Commission or brokerage paid is **added** with the cost of purchase.
Freight inwards	It is **added** with the cost of purchase as it is directly attributable to procurement of material.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STARTREK LOGISTICS PRIVATE LIMITED
Head Office: 23/24, Infantry Road,
Bangalore 560 001, Karnataka
Pan Number: AAQCS5845Q
Hot Line: 1860 420 1414
contactus@spoton.co.in

700000000

SENDER
BANGALORE 560048

DELIVERY ADDRESS
Cochin 682035
TIN NUMBER

CONTACT
TEL

Books

BOOKING DATE & TIME
25 Jan 2013 , 20:41
DECLARED VALUE
1420
BOOKING MODE
Credit Sender
CUST REFERENCE No.
1351/13

PRODUCT TYPE
ROAD EXPRESS
PERMIT DETAILS -
-
DESCRIPTION OF GOODS
ELECTRICAL GOODS

SHIPMENT DIMENSIONS (in Cms.)

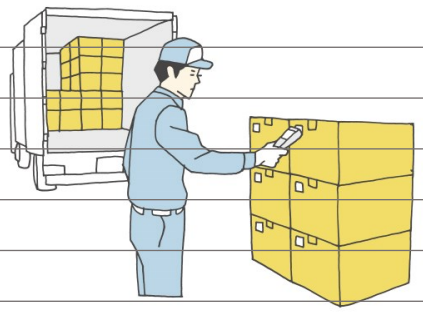
No of Pcs	Dimensions		
1	36	30	30

No. Of Pieces.
1
Actual Weight
9.0
Charged Weight
12.0

ORIGIN	BLRN
DEST	COKB

SHIPPER COPY - Retain with Customer

SAMPLE



Cost of Containers

- Treatment of cost of containers are as follows:
  - **Non- Returnable Containers**:- The Cost of containers is **added** with the cost of purchase.
  - **Returnable Containers:**
    - ❑ If on return of containers full cost of containers is **returned back** then in this case cost of containers is **not added** with the cost of purchase.
    - ❑ If the amount of refund on returning the container is **less than the amount paid** then **only short fall** is **added** with the cost of purchase.

Example 2

Case 1	Amount
Purchase Value	20,000
Cost of Container **(Non- Returnable)**	2,100
Total Value	22,100

Case 2	Amount
Purchase Value	20,000
Cost of Container **(Returnable)**	2,100
Total Value	22,100

Case 3	Amount
Purchase Value	20,000
Cost of Container **(Returnable** *)	2,100
Total Value	22,100

*Rs. 1,000 will be refund on return of container.

Shortage

Shortage in materials are treated as follows :

- **Shortage due to normal reasons:** Good units absorb the cost of shortage due to normal reasons.
  - **Example**: Losses due to breaking of bulk, evaporation, due to unavoidable conditions etc.
- **Shortage due to Abnormal Reasons**: Shortage arises due to abnormal reasons
  - **Example**: material mishandling, pilferage, due to avoidable reasons are not **absorbed** by the good units.
  - Losses due to abnormal reasons are **debited** to Costing Profit and Loss Account.

Example 3

Particular	Rs. / Quantity
Petrol Price at Depot	Rs.65 / litre
Transportation Cost up to Petrol Pump	Rs.10,000
Quantity Ordered	20 Kl
Insurance Charges	10% of Purchase value
Normal Loss due to Evaporation	4%

Case 1	Litres
Actual Quantity filled in tank	19,200

Case 2	Litres
Actual Quantity filled in tank	18,000
Note: The extra loss while filling was due to to carelessness of Petrol Pump Staff	

Que 1 SM Illustration 1 Notebook Page No.

SKD Company Ltd. , not registered under GST , purchased material P from a company which is registered under GST. The following information is available for the one lot of 1,000 units of material purchased.

Listed price of one lot	₹ 50,000
CGST & SGST (Credit not available)	12% (6%- CGST ,6% SGST)

	Cash Discount	10%
	(will be given only if payment is made within 30 days)	
	Freight and Insurance	₹ 3,400
	Trade Discount	@10% on Listed price
	Toll Tax	₹ 1,000
	Demurrage	₹ 1,000
	Commission & brokerage on Purchases	₹ 2,000
	Amount deposited for returnable container	₹ 6,000
	Amount of refund on returning the container	₹ 4,000
	Other Expenses	@2% of total cost
	20% of material shortage is due to normal reasons.	
	The payment to he supplier was made within 20 days of the purchases.	
	You are required to calculate cost per unit of material purchased to SKD Company Ltd.	

Que 2 SM Illustration 2 Notebook Page No.

An invoice in respect of a consignment of chemicals A and B provides the following information:

	₹
Chemical A : 10,000 kgs. at ₹ 10 per kg.	1,00,000
Chemical B : 8,000 kgs. at ₹ 13 per kg.	1,04,000
Basic custom duty @ 10 % (Credit is not allowed)	20,400
Railway freight	3,840
Total Cost	2,28,240

A shortage of 500 kgs. In Chemical A and 320 kgs. In Chemical B is noticed due to normal breakages. You are required to compute the rate per kg. of each chemical, assuming a provision of 2% for further deterioration.

Que 3 SM Illustration 3 Notebook Page No.

At What price per unit would Part No.A 32 be entered in the Stores Ledger, if the following invoice was received from a supplier:

Invoice	₹
200 units Part No. A 32 @ ₹ 5	1,000
Less: 20% discount	(200)
	800
Add: IGST @ 12%	96
	896
Add: Packaging Charges (5 non-returnable boxes)	50
	946

(i) A 2 per cent cash discount will be given if payment is made in 30 days.

(ii) Documents substantiating payment of SGST is enclosed for claiming Input credit.

ECONOMIC ORDER QUANTITY

- Re-order Quantity : How much to order?
  - ❑ Re-order quantity is the **quantity** of materials for which purchase requisition is made by the store department.

- How to decide?
  - ❑ While setting the quantity to be re-ordered, consideration is given to the maintenance of minimum level of stock, re-order level, minimum delivery time and the most important the cost/

- Ideal Re-order Quantity where cost is minimum is called as **Economic Order Quantity (EOQ)**.

Relevant Costs

Ordering Cost

- Ordering costs are the costs which are associated with the purchase or order of materials

- **Example**: - cost to invite quotations,
  - documentation works like preparation of purchase orders,
  - employee cost directly attributable to procurement of material,
  - transportation and
  - inspection cost etc.

Carrying Cost

- Carrying costs are the costs for holding/ carrying of inventories in store.

- **Example** : - Cost of fund invested in inventories,
  - Cost of storage
  - Insurance cost
  - Obsolescence etc.

Relation of Ordering Cost with Re-order Quantity

Details about Material 'RX'	
Daily Consumption	10 kg
Annual Requirement	3600 kg
Ordering Cost	Rs.500 per order

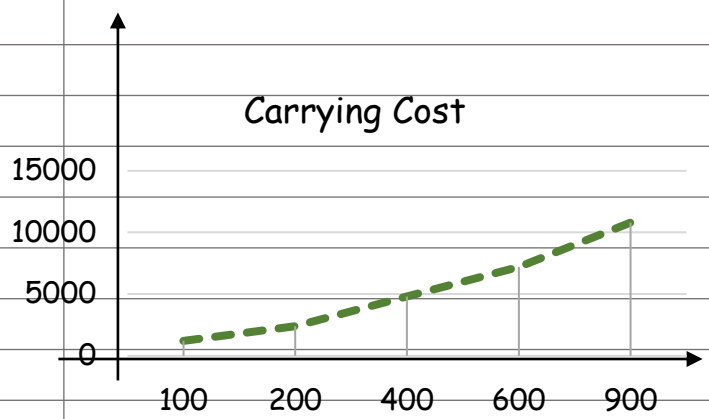
Case	Reorder Qty	No. of Order	Ordering Cost
1	100		
2	200		
3	400		
4	600		
5	900		
6	1200		

Increase in Re-order Quantity will result into _____ in Ordering Cost and vice-versa.

Relation of Carrying Cost with Re-order Quantity

Details about material 'RX'	
Daily Consumption	10 kg
Annual Requirement	3600 kg
Cost of Capital	12% p.a
Material Cost p.u	200

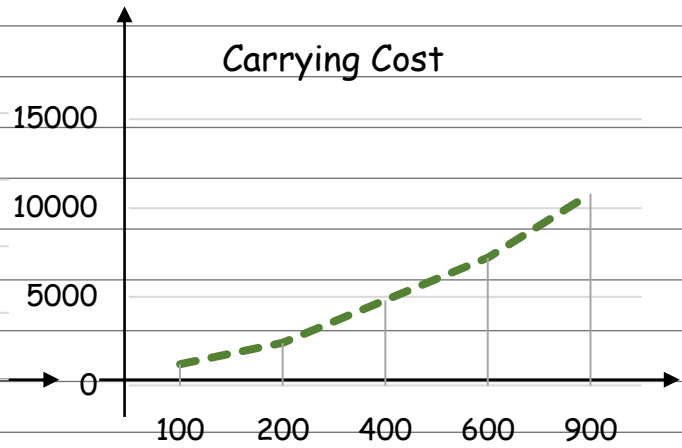
Case	ROQ	Avg. Inven.	Carrying Cost
1	100		
2	200		
3	400		
4	600		
5	900		
6	1200		



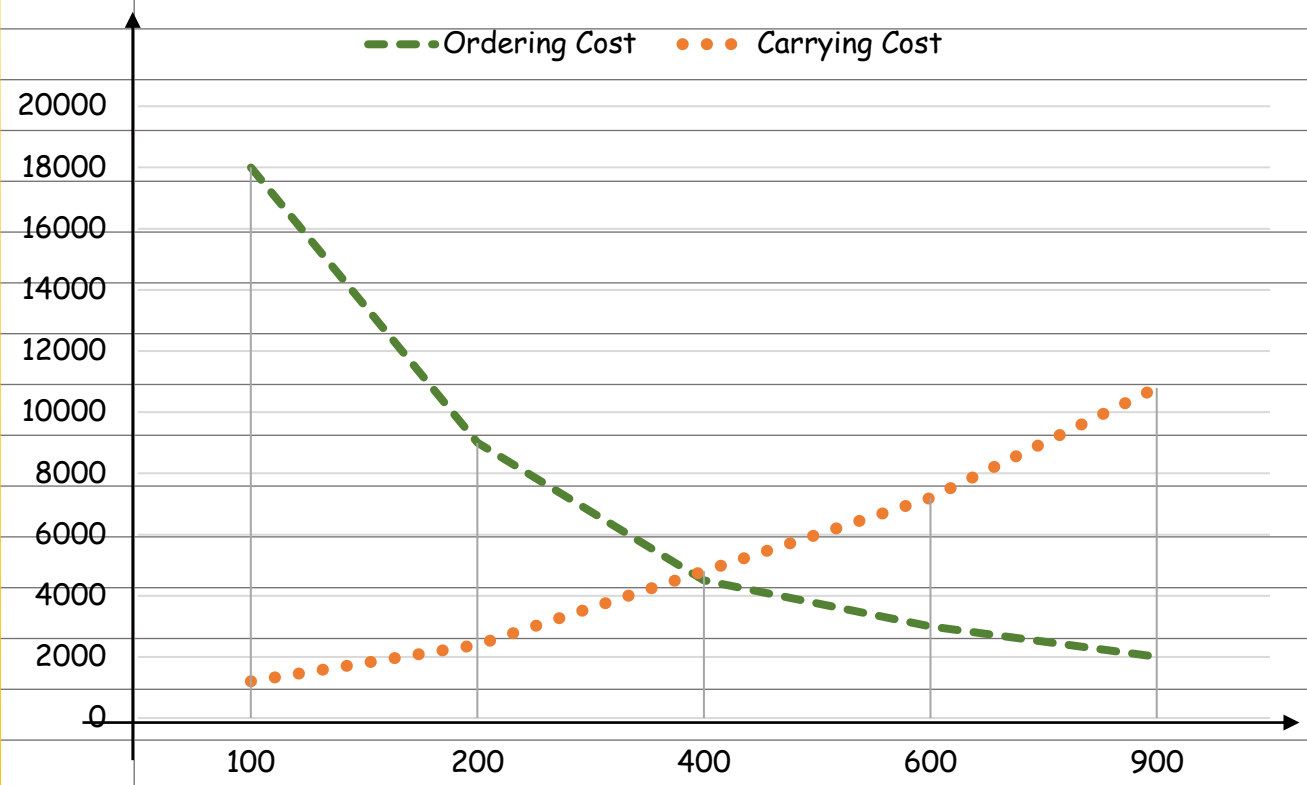
*Carrying Cost p.u. p.a. = 200 x 12% = Rs. 24

Total Carrying Cost = Rs. 24 x Average inventory.

Increase in Re-order Quantity will result into _____ in Carrying Cost and vice-versa

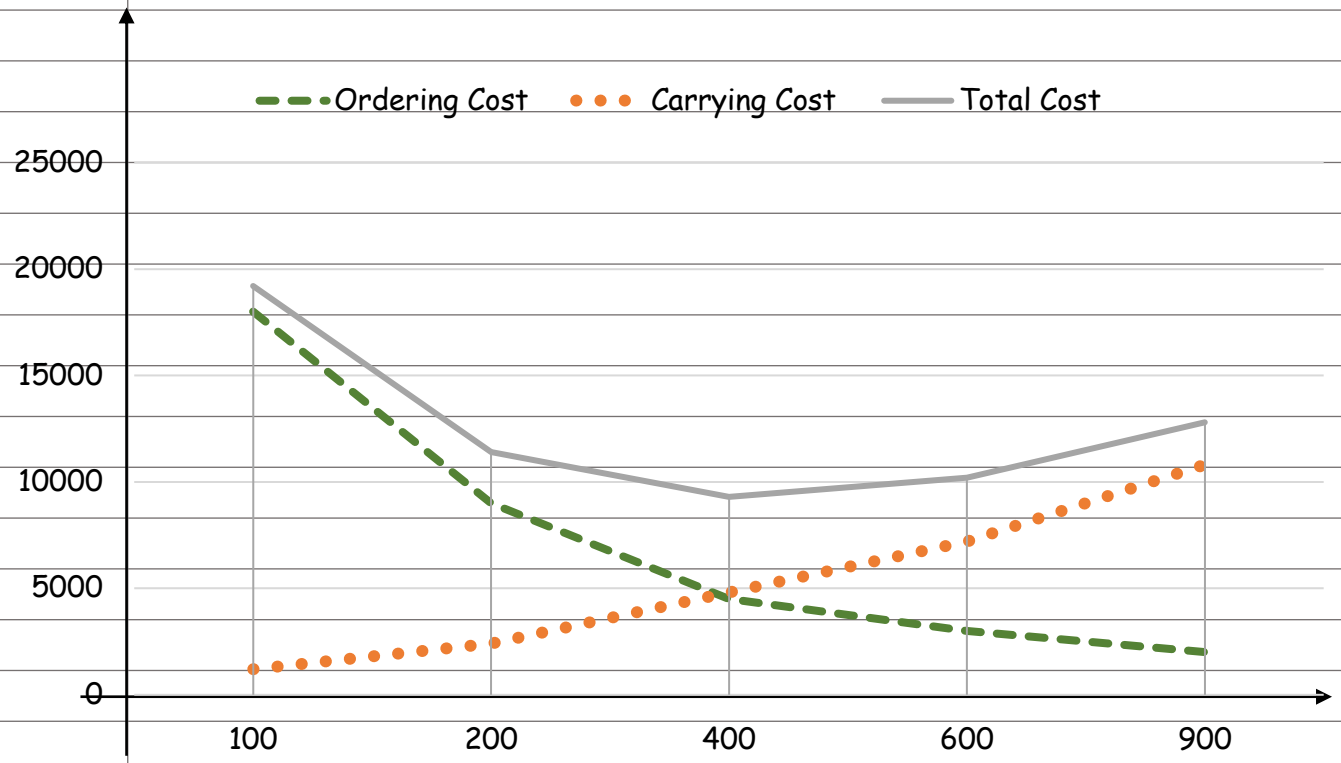


Case	Re-Order Quantity	No. of order	Ordering Cost	Average Inventory	Carrying Cost	Total Cost
1	100					
2	200					
3	400					
4	600					
5	900					
6	1200					



> It is observed that total relevant cost is **minimum** when ordering cost and carrying cost are same.

> It implies that, at EOQ **Carrying cost = Ordering cost**



Formula of EOQ:-

$$EOQ = \sqrt{\frac{2AO}{C}}$$

where,

A = Estimated Annual Requirement of Material

O = Ordering Cost per order

C = Carrying Cost per unit per annum (cost to carry one unit for one year)

Que 4 | SM Illustration 4 | Notebook Page No.

Calculate the Economic Order Quantity from the following information. Also state the number of orders to be placed in a year.

Consumption of materials per annum	: 10,000 kg.
Order placing cost per order	: ₹ 50
Cost per kg. of raw material	: ₹ 2
Storage Cost	: 8% on average inventory

Que 5	SM Illustration 5 Notebook Page No.
	(i) Calculate the Economic Order Quantity and total cost for the following:
	Annual Demand = 5,000 units
	Unit Price = ₹ 20
	Order Cost = ₹ 16
	Storage Rate = 2% per annum
	Interest Rate = 12% per annum
	Obsolescence Rate = 6% per annum
	(ii) Determine the total cost that would result for the items if a new price of ₹ 12.80 is used.
Que 6	SM Exercise Que 1 Notebook Page no.
	Anil & Company buys its annual requirement of 36,000 units in 6 instalments. Each unit costs Rs. 1 and the ordering cost is Rs. 25. The inventory carrying cost is estimated at 20% of unit value. Find the total annual cost of the existing inventory policy. How much money can be saved by Economic Order Quantity..?
Que 7	SM Exercise Que 2 Notebook Page No.
	A Company manufactures a special product which requires a component 'Alpha'. The following particulars are collected for the year 2021-22
	Annual demand of Alpha 8,000 units
	Cost of placing an order ₹ 200 per order
	Cost per unit of Alpha ₹ 400
	Carrying cost p.a. 20%
	The company has been offered a quantity discount of 4 % on the purchase of 'Alpha' provided the order size is 4,000 components at a time.
	Required:
	(i) Compute the economic order quantity.
	(ii) Advise whether the quantity discount offer can be accepted.
Que 8	SM Exercise Que 3 Notebook Page no.
	The complete Gardener is deciding on the economic order quantity for two brands of lawn fertilizer. Super Grow and Nature's Own. The following information is collected:

	Fertilizer	
	Super Grow	Nature's Own
Annual Demand	2,000 bags	1,280 bags
Relevant Order Cost per purchase order	₹ 1,200	₹ 1,400
Annual relevant carrying cost per bag	₹ 480	₹ 560

Required:

(i) Compute EOQ for Super Grow and Nature's own.

(ii) For the EOQ, what is the sum of the total annual relevant ordering costs and total annual relevant carrying costs for Super Grow and Nature's own?

(iii) For the EOQ, compute the number of deliveries per year for Super Grow and Nature's own.

Que 9 SM Exercise Que 7 Notebook Page No.

G. Ltd. produces a product which has a monthly demand of 4,000 units. The product requires a component X which is purchased at Rs. 20. For every finished product, one unit of component is required. The ordering cost is Rs. 120 per order and the holding cost is 10% p.a.

You are required to calculate:

(i) Economic order quantity.

(ii) If the minimum lot size to be supplied is 4,000 units, what is the extra cost, the company has to incur?

(iii) What is the minimum carrying cost, the company has to incur?

Assumptions of EOQ

The calculation of economic order of material to be purchased is subject to the following assumptions:

- **Ordering cost** per order and **carrying cost** per unit per annum are **known** and they are fixed.
- **Anticipated usage** of material in units is known.
- **Cost per unit** of the material is constant and is known as well

Que 10 | SM Exercise Que 5 | Notebook Page no.

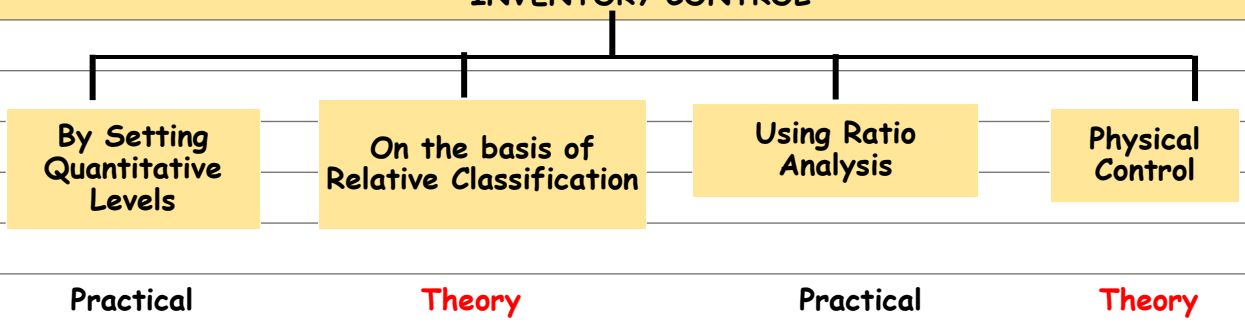
(a) Exe Limited has received an offer of quantity discounts on its order of materials as under:

Price per ton (₹)	Ton (Nos.)
1,200	Less than 500
1,180	500 and less than 1.000
1.160	1,000 and less than 2,000
1,140	2,000 and less than 3,000
1,120	3,000 and above.

The annual requirement for the material is 5,000 tons. The ordering cost per order is ₹ 1,200 and the stock holding cost is estimated at 20 % of material cost per annum. You are required to compute the most economical purchase level.

(b) What will be your answer to the above question if there are no discounts offered and the price per ton is ₹ 1,500 ?

INVENTORY CONTROL

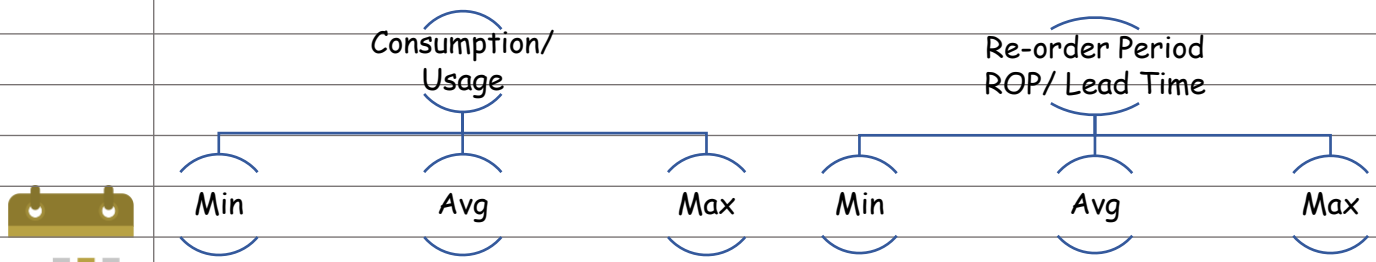


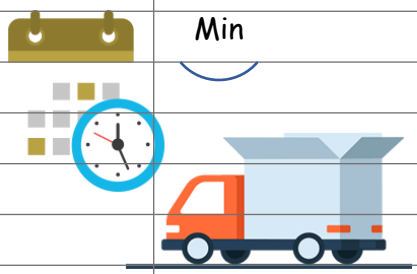
INVENTORY CONTROL BY SETTING QUANTITY LEVELS

Measurement	Purpose
Re-order Stock Level	When to order
Re-Order Quantity	How much to order
Maximum Stock level	Max level of stock based on current policy
Minimum Stock Level	Desired Minimum stock level to be maintained
Average Stock Level	Stock normally kept on an average
Danger Stock Level	Stock to be kept aside for emergency usage
Buffer Stock	Stock set aside for meeting sudden demand

BASIC TERMS

- **Daily Consumption / Usage :-** Quantity of material consumed per day in production activity.
- **Re-order Period / Lead Time :-** Time to get order from supplier to the stores.





RE-ORDER STOCK LEVEL : WHEN TO ORDER?

- **Meaning**: This level lies between minimum and maximum level, it is a level at which fresh order should be placed for replenishment of stock.

- **Approach 1:-**

Re-order Level = Maximum Usage x Maximum ROP

- **Approach 2 :-**

Re-order Level = Minimum Stock Level + (Average Usage x Average ROP)

Example 5

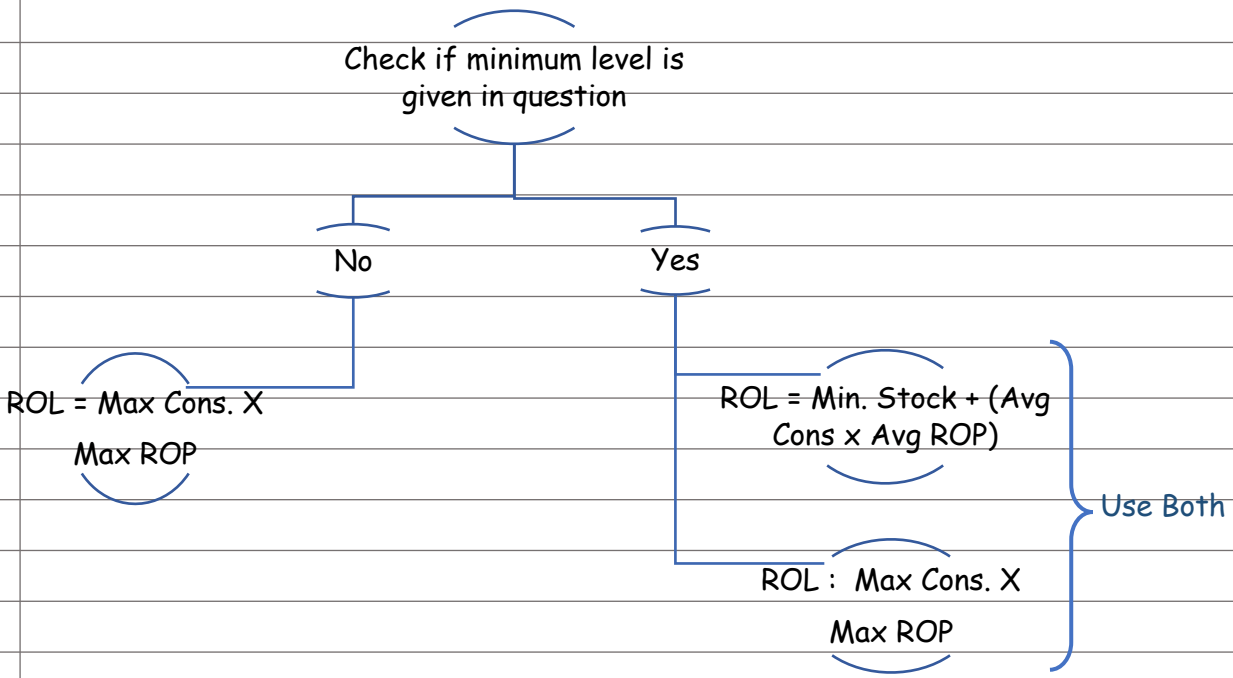
Details for Material X	
Closing Bal. on 24th Aug 2022	1,600 kg
Minimum Stock level to Be maintained	400 kg
Per Order Size	2,000 kg

Level	Consumption Per day in production
Minimum	180 kg
Maximum	220 kg
Average / Normal	200 kg

Level	Lead Time
Minimum	2 days
Maximum	4 days
Average/ Normal	3 days

Store ledger: Material X

Date	Opening bal.	Receipts	Issues	Closing bal.



MINIMUM STOCK LEVEL

- It is lowest level of material stock, which must be maintained in hand at all times, so that there is no stoppage of production due to non-availability of inventory.

- Level of Minimum Stock dependent on nature of business and management's decision However, for exam purpose we can calculate it using ROL formula

Using, Re-order Level = Minimum Stock Level + (Average Usage x Average ROP)

❑ **Minimum Stock Level = Re-order Level - (Average Usage x Average ROP)**

MAXIMUM STOCK LEVEL

- It is the **highest level** of quantity for any material which can be held in stock at any time.

- Any quantity beyond this level cause extra amount of expenditure due to engagement of fund, cost of storage, obsolescence etc.

Maximum Stock Level = Re-order Level + Re-order Quantity
- (Minimum Usage x Minimum ROP)

Example 6

Details for material RDX	
Closing balance on	
28th Feb,2021	1000kg
Minimum Stock	
level to be maintained	400kg
Re-order Quantity	800kg
Re-order Level	700kg

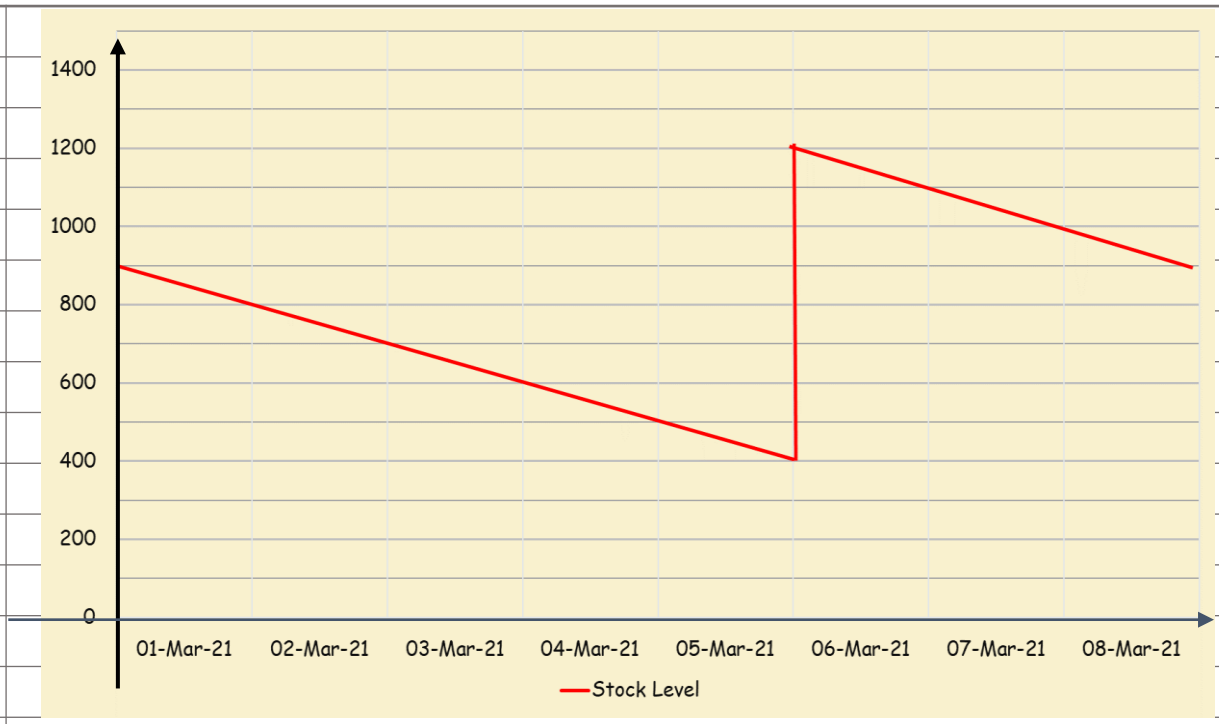
Level	Usage per day in production
Minimum	75 kg
Maximum	125 kg
Average	100 kg

Level	Lead time / Re-order Period
Minimum	2 days
Maximum	4 days
Average	3 days

Case 1: Normal Usage, Normal Lead Time after order is placed

Opening Bal. 1000kg

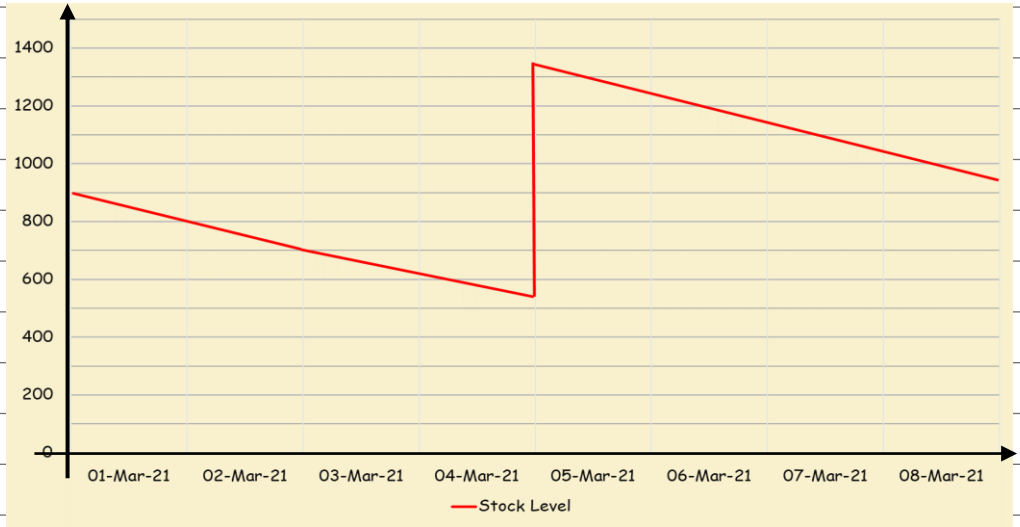
Date	Transaction Type	Qty	Balance
1-Mar-21	Issued to Production	100	900
2-Mar-21	Issued to Production	100	800
3-Mar-21	Issued to Production	100	700
4-Mar-21	Issued to Production	100	600
5-Mar-21	Issued to Production	100	500
6-Mar-21	Issued to Production	100	400
6-Mar-21	Material Received (Day End)	800	1200
7-Mar-21	Issued to Production	100	1100



Case 2: Minimum Consumption, Minimum Lead Time after order is placed

Opening Bal 1000 kg.

Date	Transaction type	Qty	Balance
1-Mar-21	Issued to Production	100	900
2-Mar-21	Issued to Production	100	800
3-Mar-21	Issued to Production	100	700
4-Mar-21	Issued to Production	75	625
5-Mar-21	Issued to Production	75	550
5-Mar-21	Material Received (Day End)	800	1350
6-Mar-21	Issued to Production	100	1250



AVERAGE STOCK LEVEL

- This is the quantity of material that is normally held in stock over a period.
- It is also known as normal stock level.

❑ Approach 1:-

Average Stock Level = Minimum Stock Level + ½ Re-Order Quantity

❑ Approach 2:-

Average Stock Level = (Maximum Stock Level + Minimum Stock Level) / 2

DANGER LEVEL

- It is the level at which normal issues of the raw material inventory are stopped and emergency issues are only made.

Danger Level = Average Usage x Lead time for emergency purchase

*sometime minimum consumption can also be used

BUFFER STOCK

- Some quantity of stock may be kept for contingency to be used in case of sudden order, such stock is known as buffer stock.

Que 11 SM Illustration 6 Notebook Page No.

Two components, A and B are used as follows:

Normal Usage	50 per week each
Maximum usage	75 per week each
Minimum Usage	25 per week each
Re-order Quantity	A: 300, B : 500
Re-order Period	A: 4 to 6 weeks
	B: 2 to 4 weeks

Calculate for each component (a) Re-ordering level, (b) Minimum level (c) Maximum level (d) Average Stock Level.

Que 12 SM illustration 7 Notebook Page no.

From the details given below, calculate:

(i) Re-ordering level

	(ii) Maximum level
	(iii) Minimum level
	(iv) Danger level.
	Re-ordering quantity is to be calculated on the basis of following information:
	Cost of placing a purchase order is Rs. 20 .
	Number of units to be purchased during the year is 5,000.
	Purchase price per unit inclusive of transportation cost is Rs. 50.
	Annual cost of storage per units is Rs. 5.
	Details of lead time : Average- 10 days, Maximum- 15 days, Minimum-5 days.
	For emergency purchases- 4 days.
	Rate of consumption : Average: 15 units per day,
	Maximum : 20 units per day.
Que 12	SM Exercise Que 6 Notebook Page no.
	From the details given below, calculate:
	(i) Re-ordering level
	(ii) Maximum level
	(iii) Minimum level
	(iv) Danger level.
	Re-ordering quantity is to be calculated on the basis of following information:
	Cost of placing a purchase order is Rs. 4000
	Number of units to be purchased during the year is 5,00,000
	Purchase price per unit inclusive of transportation cost is Rs. 50
	Annual cost of storage per units is Rs. 10.
	Details of lead time : Average- 10 days, Maximum-15 days Minimum- 5 days.
	For emergency purchases- 4 days.
	Rate of consumption : Average: 1,500 units per day,
	Maximum: 2,000 units per day.
Que 13	SM Exercise Que 4 Notebook Page No.
	A Company uses three raw materials A, B and C for a particular product for which the
	following data apply:

Raw material	Usage per unit of Product (kgs.)	Re-Order quantity (kgs.)	Price per Kg.	Delivery period (in weeks)			Re-order level (kgs)	Minimum Level (kgs)
				Minimum	Average	maximum		
A	10	10,000	10	1	2	3	8,000	?
B	4	5,000	30	3	4	5	4,750	?
C	6	10,000	15	2	3	4	?	2,000

Weekly production varies from 175 to 225 units, averaging 200 units of the said product.

What would be the following quantities:

(i) Minimum stock of A,

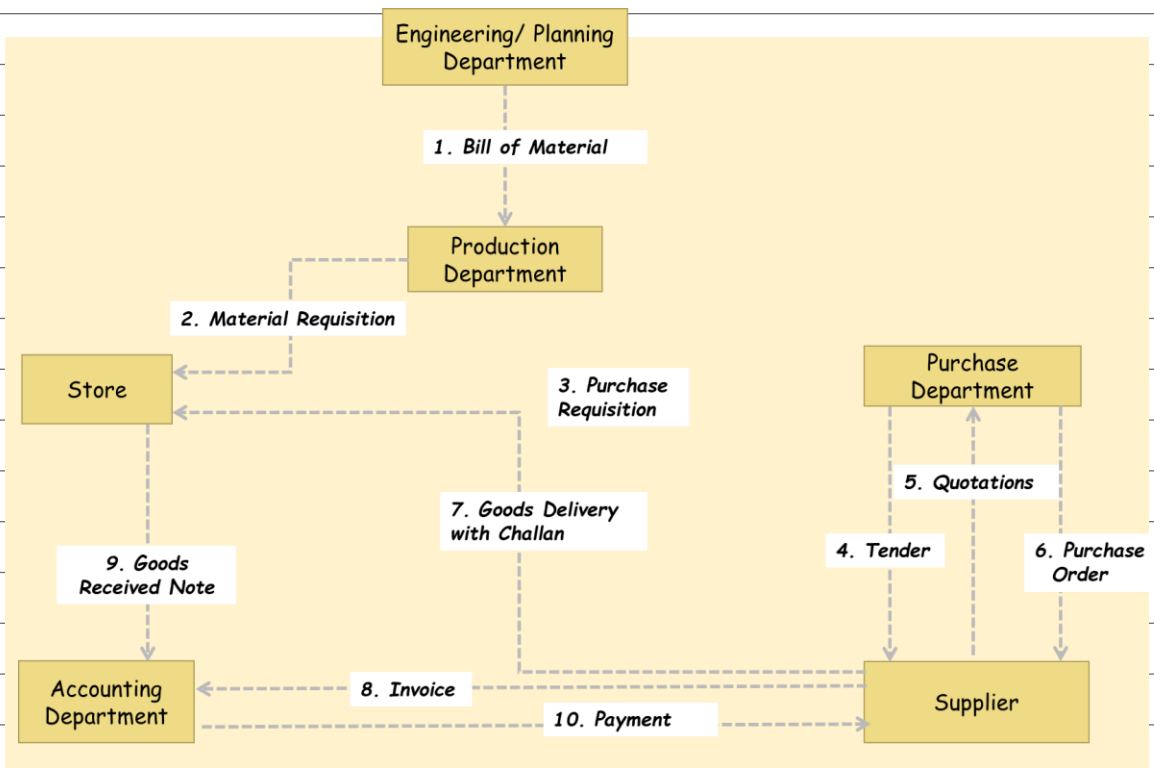
(ii) Maximum stock of B,

(iii) Re-order level of C,

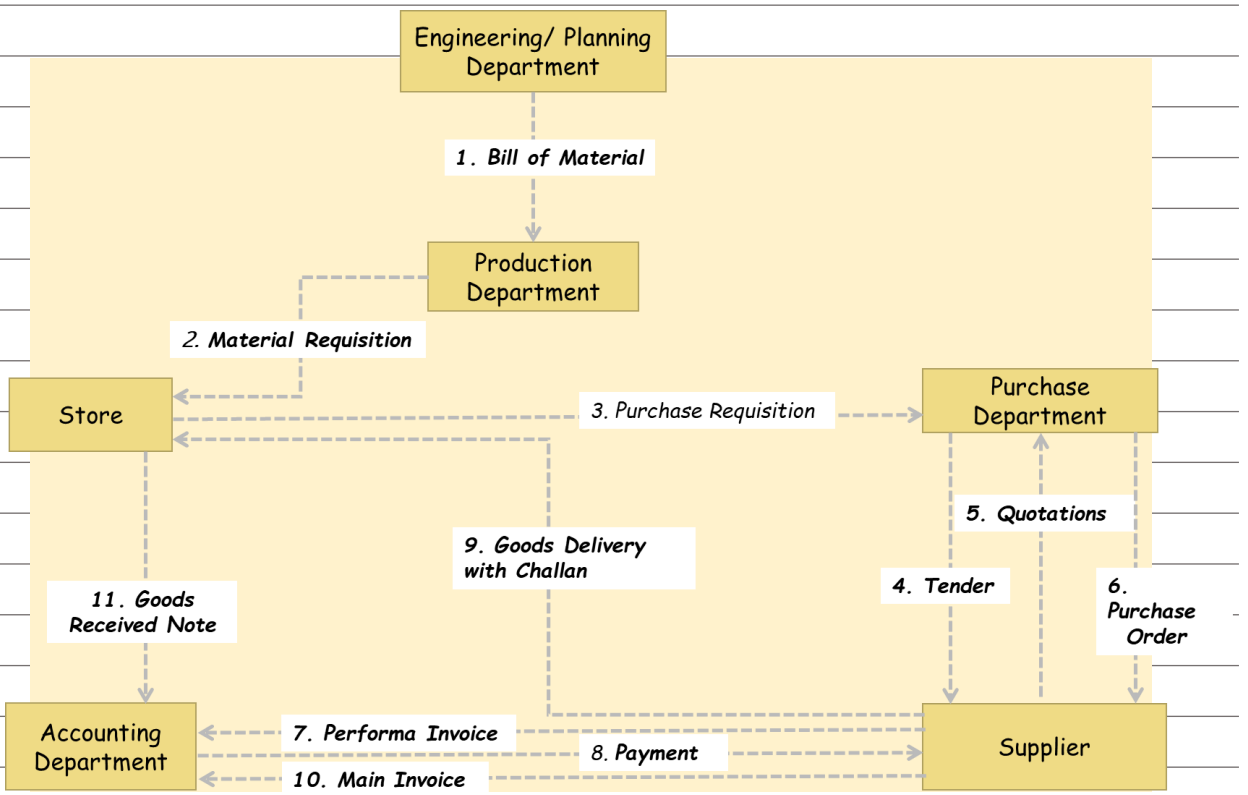
(iv) Average stock level of A.

MATERIAL PROCUREMENT PROCEDURE

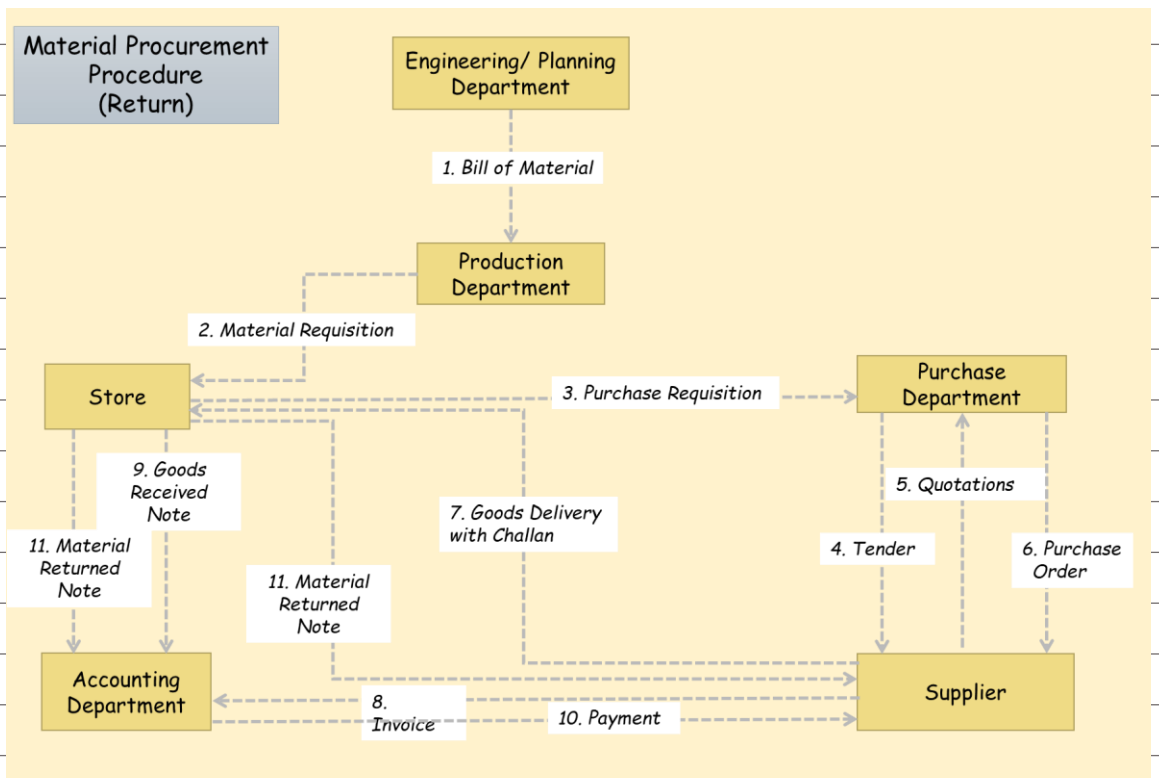
- **Material Procurement Procedure**



- **Material Procurement Procedure (advance payment)**



- **Material Procurement Procedure (Return)**



INVENTORY STOCK OUT

- **Meaning**:

  Stock out said to be occurred when an inventory item could not be supplied due to insufficient stock in the store.

- **Consequences**:

  The stock- out situation costs to the entity not only in financial terms but in **non-financial** terms also.

TERMS RELATED TO STOCK OUT

Though it may not be a monetary loss in short term but in long term it could be a reason for financial loss

Term	Explanation
Stock-Out	Stock-out means the demand of an item that could not be fulfilled because of insufficient stock level
Safety Stock	Safety stock is the level of stock of any item which is maintained in excess of lead time consumption. It is kept as cushion against any unexpected demand for that item.
Stock Out-Cost	Loss of contribution due to occurrence of stock-out
Expected Stock Out-Cost	It means weighted average of stock out costs at different levels of safety stock taking probabilities at each level as their weights.

DETERMINATION OF SAFETY STOCK

- Stock Out Cost :
  - ❑ Higher the Safety Stock Level, Lower the Stock out Cost
  - ❑ Relation: Inverse

- Carrying Cost :
  - ❑ Higher the Safety Stock Level, Higher the Carrying Cost
  - ❑ Relation: Direct

We will try to reach a safety stock level where we can **minimize** both stock out cost and carrying cost.

Que 14 SM Illustration 8 Notebook Page no.

IPL Limited uses a small casting in one of its finished products. The castings are Purchased from a factory. IPL Limited purchases 54,000 castings per year at a cost of Rs.800 per casting.

The casting are used evenly throughout the year in the production process on 360-days per-year basis. The company estimates that it costs Rs.9,000 to place a single purchase order and about Rs.300 to carry one casting in inventory for a year. The high carrying Costs result from the need to keep the casting in carefully controlled temperature and Humidity condition, and from the high cost of insurance.

Delivery from the foundry generally takes 6 days, but it can take as much as 10 days. The days of delivery time and percentage of their occurrence are shown in the following tabulation :

Delivery time (days):	6	7	8	9	10
Percentage of occurrence:	75	10	5	5	5

Required:-

(i) Compute the economic order quantity (EOQ).

(ii) Assume the company is willing to assume a 15 % risk of being out of stock . What Would be the safety stock..? The re-order point?

(iii) Assume the company is wiling to assume a 5% risk of being stock out of stock. What would be the safety stock..? The re-order point..?

(iv) Assume 5% stock-out risk. What would be the total cost of ordering and carrying inventory for one year ..?

(v) Refer to the original data. Assume that using process re-engineering the company reduces its cost of placing a purchase order to only Rs 600. In addition, company estimates that when the waste and inefficiency caused by inventories are considered, the true cost of carrying a unit in stock is Rs.720/- per year.

(a) Compute the new EOQ.

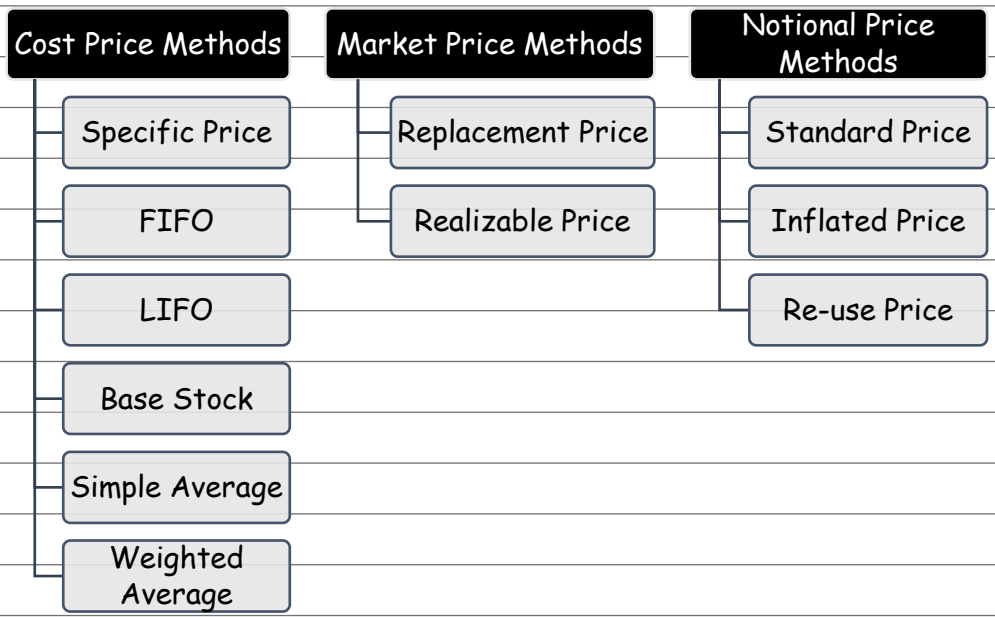
(b) How frequently would be the company be placing an order, as compared to old purchasing policy..?

VALUATION OF MATERIAL ISSUES

- Materials issued from stores should be priced at the value at which they are carried in stock.

- But there can be a situation where the material may have been purchased at different times and at different prices with varying discounts, taxes etc.

- Because of this the problem arises as to how the material issues to production are to be valued. There are several methods for tackling this situation.



FIFO:- FIRST IN FIRST OUT

- Materials are issued in the order in which they arrive in the store or the items longest in stock are issued first
- Suitable when prices are falling (logic – old high prices are charged to material cost of production while replacement cost of materials will be low)
- Unsuitable when prices are rising (logic – low prices are charged to material cost of production which is lower than current replacement cost)
- Closing stock will be near to current market price (Advantage)

LIFO:- LAST IN FIRST OUT

- This method is based on the assumption that the items of the last batch (lot) purchased are the first to be issued.
- Suitable when prices are Rising (logic – high prices which are relevant at the production will be charged to material cost)
- Not suitable when prices are falling (logic – stock will be of high cost and lower than market price, difference need to be booked as loss in balance sheet)
- This method is useful when management wants to book less profit to lower tax, Amounts but in India it is not permitted to use this method as per accounting standards and Income Tax Law.

Example 7

Calculate Material Cost (Cost of Material Consumed) and Value of Closing Stock using both FIFO and LIFO Methods :

Date	Description	Quantity	Rate
1.04.19	Opening Stock	50	300
5.04.19	Purchase	40	320
10.04.19	Issue	30	?
15.04.19	Issue	40	?
20.04.19	Purchase	25	312
25.04.19	Issue	15	?
30.04.19	Issue	10	?

Store Ledger

Name	Max Stock	Min Stock	ROL	Bin No.	Location Code

Date	Receipts				Issues				Balance			
	GRN/ MRR	Qty	Rate	Amount	Req. no.	Qty	Rate	Amount	Qty	Rate	Amount	Total

AVERAGE PRICE METHODS

- **Simple Average :**
  - ❑ Under this method, materials issued are valued at average price, which is calculated by dividing the total of rates at which different lot of materials are purchased by total number of lots
  - ❑ In this method quantity purchased in each lot is ignored
  - ❑ This method is suitable when the materials are received in uniform lots of similar quantity, and prices do not fluctuate considerably

- **Weighted Average :**
  - ❑ Unlike Simple Average Price method, this method gives due weightage to quantities also.
  - ❑ Under this method, issue price is calculated by dividing sum of products of price and quantity by total number quantities.

Example 8

During the month of April, a company has made five purchases as follows:

1st April, 200 units @ ₹ 10 each.

5th April, 150 units @ ₹ 12 each.

14th April, 210 units @ ₹ 12 each.

21th April, 50 units @ ₹ 15 each.

28th April, 140 units @ ₹ 11 each.

By using (a) Simple Average method. (b) Weighted Average Method.

Example 9

Date	Description	Quantity	Rate
01/04/2019	Opening Stock	50	300
05/04/2019	Purchase	40	320
10/04/2019	Issue	30	?
15/04/2019	Issue	40	?
20/04/2019	Purchase	25	312
25/04/2019	Issue	15	?
30/04/2019	Issue	10	?

Calculate Material Cost (Cost of Material Consumed) and Value of Closing Stock using Weighted Average Price Method.

Que 15 SM Exercise Que 9 Notebook Page no.

Material X

Opening Stock	Nil
Purchases:	
Jan 1.	100 @ ₹ 1 pe unit.
Jan 20.	100 @ ₹ 2 per unit.

Issues:-

Jan 22. 60 for Job W 16

Jan 23. 60 for Job W 17

Compute the receipts and issues valuation by adopting the First-in-First-out , Last-in-First-out and the weighted Average Method. Tabulate the values allocated to Job W 16, Job W 17 and the closing stock under the methods aforesaid and discuss from different Points of view which method you would prefer.

Que 16 SM Illustration 13 Notebook Page no.

The following transactions in respect of Material Y occurred during the six months ended 30th September, 2021

Month	Purchase (units)	Price per unit	Issued units
April	200	25	Nil
May	300	24	250
June	425	26	300
July	475	23	550
August	500	25	800
September	600	20	400

Required :

(a) The Chief Accountant argues that the value of closing stock remains the same no matter which method of pricing of material issues is used. Do you agree..? why or why not? Explain. Detailed stores ledger are not required.

(b) State when and why would you recommend the LIFO method of pricing Material issues ?

Que 17 SM Illustration 14 Notebook Page no.

The following information is provided by Sunrise Industries for the fortnight of April,

2021 :

Material Exe:

Stock on 1-04-2021 100 units at ₹ 5 per unit.

	Purchases:	
	5-4-2021	300 units @ ₹ 6 per unit.
	8-4-2021	500 units @ ₹ 7 per unit.
	12-4-2021	600 units @ ₹ 8 per unit.
	Issues:-	
	6-4-2021	250 units
	10-4-2021	400 units
	14-4-2021	500 units
	Required:	
	(a) Calculate using FIFO and LIFO methods of pricing issues:	
	(i) the value of material consumed during the period.	
	(ii) the value of stock of materials on 15-4-21.	
	(b) Explain why the figures in (i) and (ii) in part (a) of this question are different under the two methods of pricing of materials issuses used. You need not draw up the stores ledger.	
Que 18	SM Illustration 15	Notebook Page no.
	Imbrios India Ltd. Is recently incorporated start-up company back in the year 2019. It is Engaged in creating Embedded products and Internet of Things (IoT) solutions for the Industrial market. It is focused on innovation , design , research and development of products and services. One of its embedded products is Logmax, a system on module (SoM) carrier board for industrial use. It is a small , flexible and embedded computer Designed as per industry specifications . In the beginning of the month of September, 2021, company entered into a job agreement of providing 4800 LogMax to NIT, Mandi. Following details w.r.t. issues ,receipts, returns of store Department handling Micro--controller, a component used in the designated assembling process have been extracted For the month of September.,2021 ;	
	Sep. 1	Opening stock of 6,000 units @ ₹ 285 per unit.
	Sep. 8	Issued 4,875 units to mechanical division vide material requisition no. Mech 009/20
	Sep 9	Received 17,500 units @ ₹ 276 per unit vide purchases order no. 159/2020
	Sep. 10	Issued 12,000 units to technical division vide material requisition no. Tech 012/20
	Sep. 12	Returned to stores 2,375 units by technical division against material

		requisition no. Tech 012/20.
	Sep. 15	Received 9,000 units @ ₹ 288 per units vide purchase order no. 160/2020
	Sep. 17	Returned to supplier 700 units out of quantity received vide purchase order no. 160/2020
	Sep. 20	Issued 9,500 units to technical division vide material requisition no. Tech 165/20

On 25th September,2021, the stock manager of the company expressed his need to leave for his hometown due to certain contingency and immediately left the job same day. Later , he also switched his phone off.

As the company has the tendency of stock-taking every end of the month to check and report for the loss due to rusting of the components, the new stock manager, on 30th September.2021 , found that 900 units of Micro-controllers were missing which was apparently misappropriated by the former stock manger. He, further, reported loss of 300 units due to rusting of the components.

From the above info. , you are required to prepare the stock ledger account using "Weighted Average method" of valuing the issues.

Que 19 SM Exercise Que 8 Notebook Page No.

'AT' Ltd. Furnishes the following store transaction for September ,2021:

1-9-21	Opening Balance	25 units @ ₹ 162.5
4-9-21	Issues Req. No.85	8 units
6-9-21	Receipts from B & Co. GRn No.26	50 units @ ₹5.75 p.u
7-9-21	Issues Req. No. 97	12 units
10-9-21	Return to B & Co.	10 units
12-9-21	Issues Req. No.108	15 units
13-9-21	Issues Req. No. 110	20 units
15-9-21	Receipts from M & Co. GRN No. 33	25 units @ ₹ 6.1 p.u
17-9-21	Issues Req. No. 121	10 units
19-9-21	Received replacement from B & Co. GRN No.38	10 units
20-9-21	Returned from department ,material of M & Co. MRR No.4	5 units
22-9-21	Transfer from job 182 to Job 187 in the dept. MTR 6	5 units
26-9-21	Issues Req. No. 146	10 units

29-6-21	Transfer from Dept. 'A' to Dept. 'B'	
	MTR 10	5 units
30-9-21	Shortage in stock taking	2 units

Prepare the priced stores ledger on FIFO method and state how would you treat the shortage in stock taking.\

INVENTORY CONTROL BASED ON RELATIVE CLASSIFICATION

- **ABC ANALYSIS**

Category	% in terms of quantity	% in term of value	Remarks
A	10	70	High Price items, very important items
B	20	20	Moderate investment over item, general treatment
C	70	10	No constant control required, the objective is to economies on ordering and handling costs

Advantage of ABC

- Continuity in Production: mainly using stock out concept to high value items
- Lower Cost: using EOQ concept over Category C to achieve economies
- Less attention required: Management focus mainly on A category

Example 10

Analyse the following items into A, B and C categories on the basis of information given below :

Category A: Rs. 5000 and above (total value)

Category B: Rs. 1500 to Rs. 4999 (total value)

Category C: Below Rs. 1500

Item no.	Units	Unit Rate
1	150	3.00
2	2300	0.90
3	2200	0.70

4	9000	0.10
5	1300	0.15
6	4	1.50
7	20	528.25
8	3800	2.10
9	1500	1.35
10	130	0.80
11	200	0.20
12	96	0.25
13	5200	0.08
14	4000	0.10
15	100	2.85

- **FSN**

Category	Meaning
Fast Moving (regular usage)	This category of items are placed nearer to store issue point and the stock is reviewed frequently for making of fresh order.
Slow Moving (periodic usage)	These are stored little far and stock is reviewed periodically for any obsolescence and may be shifted to Non-moving category
Non Moving (no usage)	These are kept for disposal and is reported to the management and an appropriate provision for loss may be created

- **VED**

Category	**Meaning**
Vital	Items are classified as vital when its unavailability can interrupt the production process and cause a production loss. Items under this category are strictly controlled by setting re-order level
Essential	Items under this category are essential but not vital. The unavailability may cause sub standardization and loss of

	efficiency in production process. Items under this category are reviewed periodically and gets the second priority
Desirable	Items under this category are optional in nature, unavailability does not cause any production or efficiency loss.

HML

- Under this system, inventory is classified on the basis of the cost of an individual item,
- Unlike ABC analysis where inventories are classified on the basis of overall value of inventory.
- A range of cost is used to classify the inventory items into the three categories.
  - High Cost inventories are given more priority for control,
  - whereas Medium cost and Low cost items are comparatively given lesser priority.

INVENTORY CONTROL BY RATIO ANALYSIS

- **Input-Output Ratio**
- **Inventory Turnover Ratio**

Input-Output Ratio

- Inventory control can also be exercised by the use of input output ratio analysis.
- **Input-output ratio** = "quantity of input of material to production " /"standard material content of the actual output"
- This type of ratio analysis enables comparison of actual consumption and standard consumption, thus indicating whether the usage of material is favorable or adverse.

Inventory Turnover Ratio

- **Inventory Turnover Ratio** = "Cost of materials consumed during the period " / "Cost of average stock held during the period"
- **Use**:
  - ❑ Using this, we calculate average no. of days of inventory holding which is used in

comparing the number of days in the case of two different materials,

- ❑ Also, it is possible to know which is fast moving and which is slow moving.
- ❑ On this basis, attempt should be made to reduce the amount of capital locked up, and prevent over-stocking of the slow moving items.

- **Avg no. of days of inventory holding** = 365 days /Inventory Turnover Ratio

Que 20 SM Illustration 11 Notebook Page No.

The following data are available in respect of Material X for the year ended 31st March, 2021.

	(₹)
Opening Stock	90,000
Purchases during the year	2,70,000
Closing Stock	1,10,000

Calculate:

(i) Inventory turnover ratio and

(ii) The turnover of days for which the average inventory is held.

Que 21 SM Illustration 12 Notebook Page no.

From the following data for the year ended 31st Martch, 2021. Calculate the inventory Turnover ratio of the two items and put forward your comments on them;

	Material A (₹)	Material B (₹)
Opening Stock 1.04.20	10,000	9,000
Purchase during the year	52,000	27,000
Closing stock 31.03.21	6,000	11,000

Chapter 3

EMPLOYEE COST

Past Trends:

May 2018	Nov 2018	May 2019	Nov 2019	Nov 2020	Jan 2021	July 2021	Dec 2021	May 2022
15	5	10	10	10	10	10	5	10

LABOUR

- It means **any physical or mental human effort**
- Person doing the labour is called as **Labourer**

EMPLOYEE (LABOUR) COST

- **Meaning:**
  - -- Benefits paid or payable to the employees of an entity,
  - -- whether permanent, or temporary ,
  - -- for the services rendered by them
  - -- where payments made in cash or kind.

- **Inclusion of different terms under employee cost:**
  - -- Wages and Salaries
  - -- Allowances and Incentives
  - -- Payment for Overtimes
  - -- Employer's Contribution to PF and other welfare funds
  - -- Other benefits: (leave with pay, free or subsidized food, leave travel concession etc.) etc.

- **What is Employee Cost Control?**
  - -- Employee costs are associated with human beings.
  - -- To control employee costs one has to understand human behavior=
  - -- Employee cost control means control over the cost incurred on employees.
  - -- Control over employee costs does not imply control over the size of the wage bill; it also does not imply that wages of each employee should be kept as low as possible.

-- The aim should be to keep the **wages per unit of output** as low as possible.

- This can only be achieved by giving employees appropriate compensation to encourage efficiency so that optimum output can be achieved in effective manner.

Example 1

Particular	Amount
Wage rate /hr.	Rs.70
No. of hours worked	8 hours
Output produced	4 units

Particular	Amount
Wage rate/ hr.	Rs.70
Bonus (for producing target 5 units in 8 hours}	Rs.50
No. of hours worked	8 hours
Output produced	5 units

DEPARTMENTS ASSOCIATED WITH EMPLOYEE COST

- To achieve employee cost control, there has to be a coordinated effort by all the concerned departments.

Personnel Dept.	It is also known as HR Team. Tasks – find candidates with required qualification and skills, proper recruitment, arranging proper training, maintain personal and job related records, evaluation at regular intervals
Engineering dept.	Tasks – Prepare plans and specifications for each job, training to employees, supervision while production, job analysis etc.
Time Keeping dept.	Tasks – Maintenance of attendance records, time keeping, time booking (time spent on each job)
Payroll Dept.	Preparation of Payroll, Salary Processing

Cost Accounting Dept.	Accumulation and classification of Employee Cost, Analysis and allocation to cost centres and cost objects

PAYMENT STRUCTURES

- **Time Rate Based:** When payment is done based on time/ hours/ days worked.

- **Piece Rate Based:** When payment is done based on output units produced .

  - ❑ Piece rates are frequently used in certain industries or occupations where the work is repetitive in nature, and where employees have a high level of control over the results.

  - ❑ **Examples** include such tasks as plucking tea, pruning fruit trees etc.

  - ❑ Home based workers and other out-workers (who work in premises other than that of the employer) are also frequently paid piece rates.

TIME KEEPING

- It refers to correct recording of the employees' attendance time.

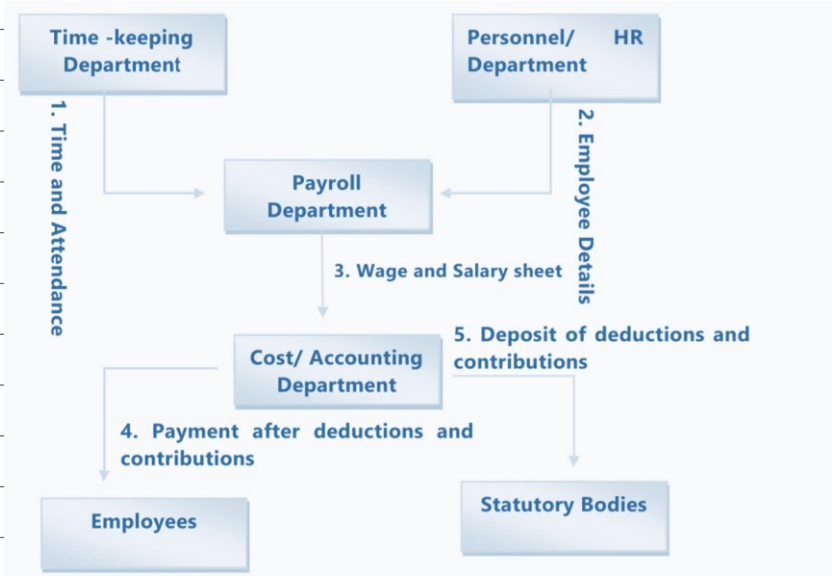
- **Objective:**
  - ❑ For the preparation of payrolls
  - ❑ For calculating overtime
  - ❑ For ascertaining and controlling employee cost
  - ❑ For ascertaining idle time
  - ❑ For disciplinary purposes
  - ❑ For overhead distribution.

- **Methods:** Attendance Register, Punch Card, Biometric

TIME BOOKING

- It refers to a method wherein each activity of an employee is recorded.
- Use of Time booking is for costing, to measure efficiency and fixation of responsibility to check productivity.
- This can be done by maintaining a record called as Time Card/ Job Card .

PAYROLL PROCEDURE



COMPONENTS OF SALARY AND WAGES

Component	Details
Basic Wages	The basic wage is the payment for work done, measured in terms of hours attended or the units produced, as the case may be. The basic wage rate is not normally altered unless there is a fundamental change in the working conditions or methods of manufacture.
Dearness allowance	DA is an allowance provided to cover the increase in cost of living from one period to another. This allowance is calculated either as percentage of the basic wage or as a fixed amount for the days worked
Overtime Allowance	It is an allowance paid for the extra hours worked at the rates laid down in the Factories Act
Production bonus	It is an incentive payment made to workers for efficiency that results in production above the standard. There are different methods of computing incentives.
Non- Monetary Benefits	Medical Facilities, Educational and training facilities, Recreational, Sports, Housing and Welfare, Cost of Canteen.
Employer's Contribution to Welfare Funds	This is part of salary and CTC as it is added by employer other than main salary and deposited to Govt on employee's behalf

DEDUCTIONS FROM SALARY

Name	Type	Deductions
Provident Funds	Statutory	Employee's contribution to the Provident fund is deducted from the salary/ wages of the concerned employee.
Employee State Insurance Scheme (ESI)	Statutory	Employee's contribution to the ESI is deducted from the salary/ wages.
Tax Deduction at Source (TDS)	Statutory	Employer is obliged to deduct tax at source if it will be paying to the employee net salary exceeding maximum exemption limit, in equal monthly installments to the income dept.
Professional Tax	Statutory	Professional tax is a state level tax imposed for carrying on business, profession or service.
Voluntary contribution to Provident fund	Non-Statutory	If any employee so desires may contribute over and above the contribution payable by the employer.
Contribution benevolent fund.	Non-Statutory	An employee may benevolent contribute to any fund voluntarily by putting a request to the payroll department.
Loans deductions	Non-Statutory	Installments of any loan taken by the employee.
Other Advances & dues	Non-Statutory	Other advances like festival advance and unadjusted advances taken.

IDLE TIME

- **Meaning**:
  - ❑ The time during which no production is carried-out because the worker remains idle but are paid.
  - ❑ Difference between the time paid and the time booked.
  - ❑ Types: Normal and Abnormal Idle Time.

NORMAL IDLE TIME

- It is the time which cannot be avoided or reduced in the normal course of business.

- It is part of cost and already included in Standard Wage Rate to be charged to production.

- **Reasons:**

  Walking time from Gate to Plant, Break between jobs, Setup time of Machine, Lunch Break, Normal Rest Time.

ABNORMAL IDLE TIME

- Idle time which is not classified as normal
- It is not part of cost of production and will be charged to Costing P&L.
- Cost of abnormal time should be classified into below categories to help management in responsibility fixation of controllable part:
  - ➔ Controllable
  - ➔ Uncontrollable

- **Controllable abnormal idle time** refers to that time which could have been put to productive use had the management been more alert and efficient.

- **Uncontrollable abnormal idle time** refers to time lost due to abnormal causes, over which management does not have any control e.g., breakdown machines, flood etc. may be characterized as uncontrollable idle time.

- **Examples:** lack of coordination, Power Failure, Machine Breakdown, Non-availability of raw materials, strikes, lockouts, poor supervision, fire, flood, etc.

EFFECTIVE WORKING HOURS:

- Hours used to calculate Normal employee cost per hour to charge to cost of production.

- **Formula :- Total Hours – Normal idle time hours**

Que 1	SM Illustration 1	Notebook Page no.
	"X" an employee of ABC Co. gets the following emoluments and benefits:	
	(a) Basic Pay	₹10,000 p.m.
	(b) Dearness allowance	₹ 2,000 p.m.
	(c) Bonus	20% of salary and D.A.
	(d) Other allowances	₹ 2,500 p.m.

(e) Employer's contribution to P.F. 10% of salary and D.A.

'X' works for 2,400 hours per annum out of which 400 hours are non-productive and treated as normal idle time. You are requested to compute the effective hourly cost of employee 'X'.

Que 2 SM Illustration 2 Notebook Page no.

In a factory working six days in a week and eight hours each day, a worker is paid at The rate of ₹ 100 per day basic plus D.A. @ 120% of basic. He is allowed to take 30 minutes off during his hours shift for meals-break and a 10 minutes recess for rest. During a week ,his card showed that his time was chargeable to :

Job X	15 hrs.
Job Y	12 hrs.
Job Z	13 hrs.

The time not booked was wasted while waiting for a job. In Cost Accounting, State how would you allocate the wages of the workers for the week..?

OVERTIME

Overtime work	Means work done beyond normal working hours
Overtime Payment	Amount of wages paid for overtime work. It has two components: ▪ Normal Wages for Overtime work ▪ Premium payment for overtime work (Overtime Premium)
Overtime Premium	The rate for overtime work is higher than the normal time rate; usually it is at double the normal rates. The extra amount so paid over the normal rate is called overtime premium.

Example 2

Wage Rate	₹ 50 / hr.
Normal Working hours in a day	8 hrs.
Actual hours in a day	10 hrs.

Overtime hours should be paid at 2.5 times the normal wage.
rate. Find the values of Ordinary wages, OT payment, OT Premium.

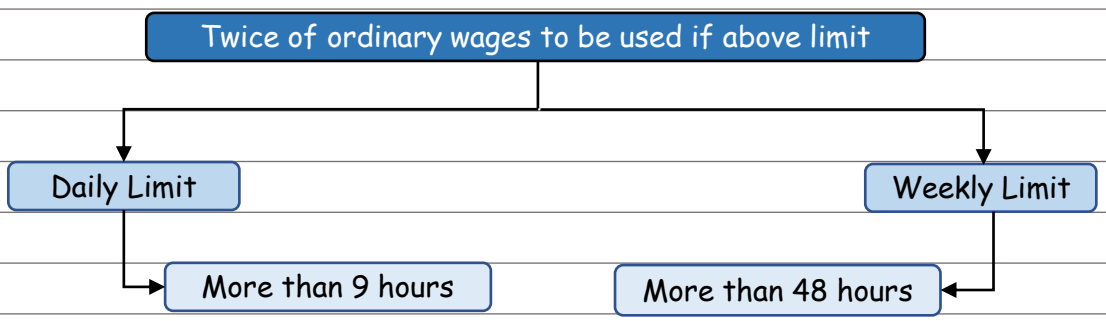
Example 3

	Employee X	Employee Y	Employee Z
Wage rate	₹ 50/ hr.	₹60/hr.	₹45/hr.
Normal working hours in a day	8 hrs.	8 hrs.	8 hrs.
Actual hours in a day	10 hrs.	9 hrs.	8 hrs.

OT rate is 2 time the normal wage rate and applicable if worker works for more than 8 hours in a day. Find the value of Ordinary Wages, OT Payment and OT Premium for each worker. Also find equivalent normal hours.

OVERTIME

Rate used in OT Premium	It should not be lower than the rates decided by **Factories Act, 1948**
Rate and condition given by Factory Act,1948	As per the Factories Act 1948 "Where a worker works in a factory for more than nine hours in any day or for more than forty eight hours in any week, he shall, in respect of overtime work, be entitled to wages at the rate of twice his ordinary rate of wages".
Ordinary Rate of Wages include	> Basic wages plus allowances including non-cash allowance > but does not include a bonus or overtime wages > Employer's Contribution to PF etc. also not included (as per Study Mat Illustration)



Example 4

	Employee X	Employee Y	Employee Z
Wage Rate	₹50/hr.	₹60/hr.	₹45/hr.
Normal working hours in a day	8 hrs.	8hrs.	8hrs.
Actual hours in a day	10hrs.	9hrs.	8.5hrs

Find the value of Ordinary Wage, OT Payment and OT Premium for each worker if OT is applied as per Factories Act,1948.

Que 3 SM Illustration 4 Notebook Page no.

It is seen from the job card for repair of the customer's equipment that a total of 154 Labour hours have been put in as detailed below.

Week days (hours)	Worker 'A' paid at ₹200 Per day of 8hrs.	Worker 'B' paid at ₹100 Per day of 8hrs.	Worker 'C' paid at ₹300 per day of 8 hours.
Monday	10.5	8.0	10.5
Tuesday	8.0	8.0	8.0
Wednesday	10.5	8.0	10.5
Thursday	9.5	8.0	9.5
Friday	10.5	8.0	10.5
Saturday	-	8.0	8.0
Total (hours)	49.0	48.0	57.0

In terms of an awards in employee conciliation, the workers are to be paid dearness allowance on the basis of cost of living index figures relating to each month which works out @968 for the relevant month. The dearness allowance is payable to all workers irrespective of wage rate if they are present or are on leave with wages on all working days.

Sunday is a weekly holiday and each worker has to work for 8 hours on all week days and 4 hours on Saturday, the workers are however paid full wages for Saturday (8 hours for 4 hours worked)

Overtime is paid twice of ordinary wage rate if a worker works for more than nine hours in a day or fourty eight hours in a week. Excluding holidays, the total number of hours works out to 176 in the relevant month. The company's contributuin to Provident Fund and Employees State Insurance Premium are absorbed into overheads.

Calculate the wages payable to each worker.

Que 4 SM Illustration 3 Notebook Page no.

Calculate the earnings of A and B from the following particulars for a month and allocate the employee cost to each job X, Y and Z.

	A	B
(i) Basic Wages (₹)	10,000	16,000
(ii) Dearness allowance	50%	50%
(iii) Contribution to Provident Fund (on basic wages)	8%	8%
(iv) Contribution to Employee's State Insurance (on basic wages)	2%	2%
(iv) Overtime (hours)	10	-

The normal working hours for the month are 200. Overtime is paid at double the total of normal wages and dearness allowance. Employer's contribution to state Insurance and Provident Fund are at equal rates with employees' contributions. The two workers were employed on jobs X, Y and Z in the following proportions:

Jobs	X	Y	Z
Worker A	40%	30%	30%
Worker B	50%	20%	30%

Overtime was done on Job Y.

TREATMENT OF OVERTIME PREMIUM

Causes and Treatment of OT Premium	
If overtime is resorted to/ opted at the request of customer	Overtime Premium will be charged to Job (consider as direct cost)
If overtime is required as a normal course of business or for meeting urgent orders (Irregular/ Healthy Overtime)	Overtime Premium should be treated as Overhead cost of concerned department / cost centre.

If overtime is worked due to fault of another department .	Overtime Premium should be charged to the responsible department
If overtime is worked due to abnormal conditions like flood, earthquake, etc.	Overtime Premium should be charged to Costing P&L
If overtime is required regularly because of worker's shortage	Overtime Premium should be absorbed under Wage Rate and that increased rate will be called as Average Inflated Wage Rate.

Que 5 SM Illustration 5 Notebook Page no.

In a factory , the basic wage rate is ₹100 per hour and overtime rates are as follows

Before and after normal working hours	175% of basic wage
Sundays and holidays	225% of basic wage
During the previous year, the following hours were worked	
- Normal	1,00,000 hours
- Overtime	20,000 hours
Overtime on Sundays and holidays	5,000 hours
Total	1.25.000 hours

The following hours have been worked on job 'Z'

Normal	1,000 hours
Overtime before and after working hrs.	100 hours
Sundays and holidays	25 hours
Total	1,125 hours

You are required to calculate the labour cost chargeable to job 'Z' and overhead in each of the following instances:

(a) Where overtime is worked regularly throughout the year as a policy due to the workers' shortage.

(b) Where overtime is worked irregularly to meet the requirements of production.

(c) Where overtime is worked at the request of the customer to expedite the job.

PREMIUM BONUS METHODS OF INCENTIVE

- Under these methods, standard time is established for performing a job.
- The worker is guaranteed his daily wages, if his output is below and up to standard.
- In case the task is completed in less than the standard time, benefit of the saved time is shared between the employee and the employer.:
- There are two methods :
  - ❑ Halsey Premium Plan
  - ❑ Rowan Premium Plan

HALSEY PREMIUM PLAN

Features:

- Under Halsey premium plan a standard time is fixed for each job or process.
- If there is no saving on this standard time allowance, the worker is paid only his day rate.
- He gets his time rate even if he exceeds the standard time limit, since his day rate is guaranteed.
- If he does the job in less than the standard time, he gets a bonus equal to 50 percent of the wages of time saved.
- This scheme is also referred to as the **Halsey Fifty Percent Plan**
- Given by **Frederick A. Halsey**
  - ❑ Formula of Wage Calculation :

Wages = (Time Taken × Time Rate) + (50% of Time Saved × Time Rate)

Advantages :

- Time rate is guaranteed while there is opportunity for increasing earnings by increasing production.
- The system is equitable in as much as the employer gets a direct return for his efforts in improving methods and equipment.

Disadvantage:

- Incentive is not so strong as with piece rate system. In fact the harder the worker works, the lesser he gets per piece.

- The sharing principle may not be liked by employees.
- Encouraging high efficiency which may undermine quality

ROMAN PREMIUM PLAN

Features:

- According to this system a standard time allowance is fixed for the performance of a job and bonus is paid if time is saved.
- Under Rowan System the bonus is that proportion of the time wages as time saved bears to the standard time.
- Here we are not directly using any percentage, but the factor is designed in such a way that it discourage very high efficiency to protect quality.

Formula of Wage Calculation :

Total Wages = (Time Taken × Time Rate) + (50% of Time Saved × Time Rate)

Advantages :

- It is claimed to be a fool-proof system in as much as a worker can never double his earnings even if there is bad rate setting.
- It is admirably suitable for encouraging moderately efficient workers as it provides a better return for moderate efficiency than under the Halsey Plan
- The sharing principle appeals to the employer as being equitable

Disadvantages

- The system complicated.
- The incentive is weak at a high production level where the time saved is more than 50% of the time allowed.
- The sharing principle is not generally welcomed by employees.

Term	Symbol
Time Taken (Actual Hours)	AH
Time Allowed (Standard Hours)	SH
Time Rate (Wage Rate Time Based)	TR
Time Saved (Standard Hours - Actual Hours)	TS

Example 5

Given for a worker X,

Standard time to complete the production of one unit is 8 hours

Wage Rate Rs. 200 per hour. Bonus is applicable as per Halsey Method.

Find bonus amount, total earnings, hourly earning and employee cost per unit of output in each of the below scenarios:

Scenario #	Actual Hours Taken
A	5 hours
B	3.5 hours
C	2 hours

Example 6

Given for a worker X,

Standard time to complete the production of one unit is 8 hours

Wage Rate Rs. 200 per hour. Bonus is applicable as per Rowan Method.

Find bonus amount, total earnings, hourly earning and employee cost per unit of output in each of the below scenarios:

Scenario #	Actual Hours taken
A	5 hours
B	3.5 hours
C	2 hours

Comparison of Rowan and Halsey

Calculate bonus by Rowan & Halsey Method respectively.

Time allowed	7 hours
Time Taken	5 hours
Hourly Rate	Rs. 200
Time Saved	2 hours
Saving %	28.57%

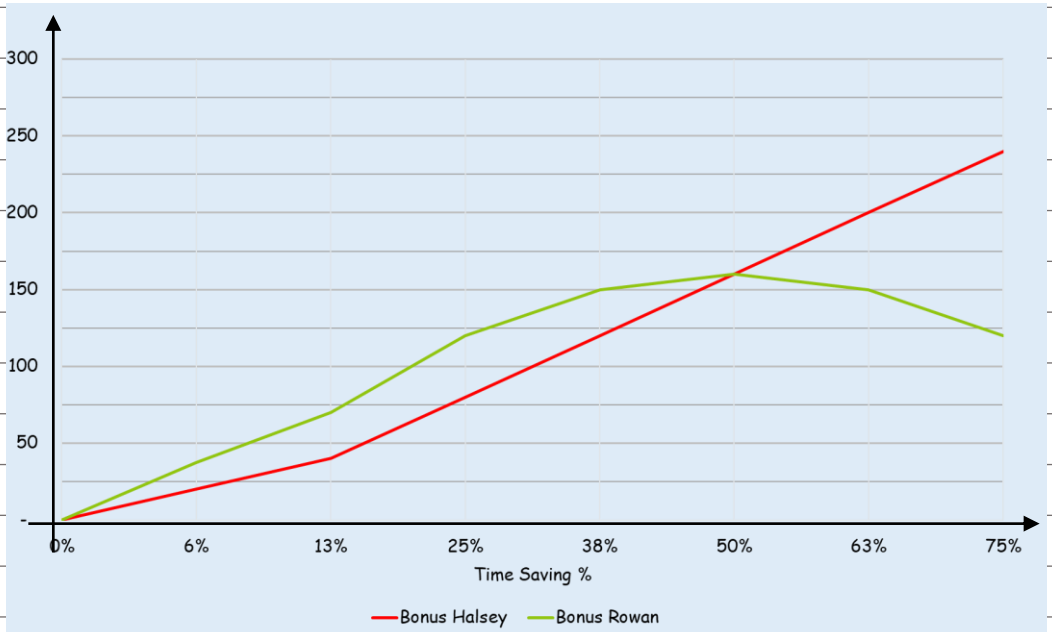
Time allowed	7 hours
Time Taken	3.5 hours
Hourly Rate	Rs. 200
Time Saved	3.5 hours
Saving %	50%

Time allowed	7 hours
Time Taken	2 hours
Hourly Rate	Rs.200
Time Saved	5 hours
Saving %	71.43%

Example 7

TR	SH	AH	TS	Saving %	TS x 50%	Halsey Bonus	$\frac{TS}{SH} \times AH$	Rowan Bonus
80	8	8						
80	8	7						
80	8	6						
80	8	5						
80	8	4						
80	8	3						
80	8	2						

Diagrammatic Presentation of above



Que 6 SM Illustration 6 Notebook Page no.

Calculate the earnings of a worker under Halsey System. The relevant data is as below:

Time Rate (per hour)	₹60
Time allowed	8 hours
Time taken	6 hours
Time saved	2 hours

Que 7	SM Illustration 7	Notebook Page no.
	Calculate the earnings of a worker under Rowan System. The relevant data is as below:	
	Time Rate (per hour)	₹60
	Time allowed	8 hours
	Time taken	6 hours
	Time saved	2 hours
Que 8	SM Illustration 10	Notebook Page no.
	A skilled worker in XYZ Ltd. is paid a guaranteed wage rate of Rs. 30 per hour The standard time per unit for a particular product is 4 hours. Mr. P a machine man, has been paid wages under the Rowan Incentive Plan and he had earned an effective hourly rate of Rs. 37.50 on the manufacture of that particular product.	
	State What could have been his total earnings and effective hourly rate, had he been put on Halsey Incentive Scheme (50%)?	
Que 9	SM Exercise Que 1	Notebook Page no.
	Mr. A. is working by employing 10 skilled workers. He is considering the introduction of some incentive scheme - either Halsey Scheme (with 50% bonus) or Rowan Scheme of wage payment for increasing the Employee productivity to cope with the increased demand for the product by 25%. He feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it could act as sufficient incentive for them to produce more and he has accordingly given this assurance to the workers.	
	Hourly rate of wages (guaranteed)	₹40
	Average time for producing 1 piece by one worker at the previous performance (This may be taken as time allowed)	2 hours
	No. of working days in a month	25
	No. of working hours per day for each other	8
	Actual production during the month	1,250 units
	Required :	
	(i) Calculate effective rate of earnings per hour under Halsey Scheme and Rowan Scheme.	
	(ii) Calculate the savings to Mr. A in terms of direct labour cost per piece under the schemes.	

Que 10	SM Exercise Que 2 Notebook Page no.
	Wage negotiations are going on with the recognized employees' union, and the management wants you as the as an executive of the company to formulate an incentive scheme with a view to increase productivity.
	The case of three typical workers A, B and C who produce respectively 180, 120 and 100 units of the company's product in a normal day of 8 hours is taken up for study.
	Assuming that day wages would be guaranteed at Rs. 75 per hour and the piece rate would be based on a standard hourly output of 10 units, Calculate the earnings of each of the three workers and the employee cost per 100 pieces under (i) Day wages, (ii) Piece rate, (iii) Halsey scheme, and (iv) The Rowan scheme.
	Also calculate under the above schemes the average cost of labour for the company to produce 100 pieces.
Que 11	SM Illustration 8 Notebook Page no.
	Two workmen, A and 'B, produce the same product using the same material. Their normal wage rate is also the same. 'A is paid bonus according to the Rowan system, while 'B' is paid bonus according to the Halsey system. The time allowed to make the product is 50 hours. 'A takes 30 hours while 'B' takes 40 hours to complete the product. The factory overhead rate is Rs.5 per man-hour actually worked. The factory cost for the product for 'A is ₹ 3,490 and for 'B' it is ₹ 3,600.
	Required: (a) Compute normal rate of wages ; (b) Compute cost of Material cost ; (c) Prepare a statement comparing the factory cost of the products as made by two workmen ;
	OTHER PROBLEMS ON ABSORPTION OF WAGES
Que 12	
	A worker is paid Rs. 10,000 per month and a dearness allowance of Rs. 2,000 p.m. Worker contribution to provident fund is @ 10% and employer also contributes the same amount as the employee. The Employees State Insurance Corporation premium is 6.5% of wages

of which 1.75% is paid by the employees. It is the firm's practice to pay 2 months' wages as bonus each year.

The number of working days in a year are 300 of 8 hours each. Out of these the worker is entitled to 15 days leave on full pay. Calculate the wage rate per hour for costing purposes.

Que 13 | SM Illustration 13 | Notebook Page no.

Calculate the Employee hour rate of a worker X from the following data:

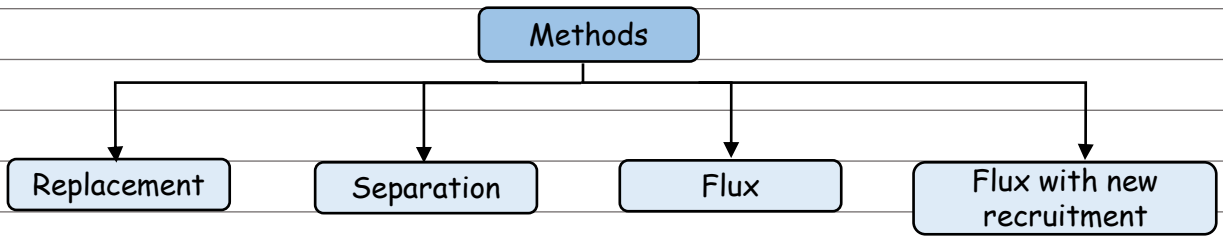
Basic pay	₹ 10,000 p.m.
D.A.	₹ 3,000 p.m.
Fringe benefits	₹ 1,000 p.m.

Number of working days in a year 300. 20 days are availed off as holidays on full pay in a year. Assume a day of 8 hours.

EMPLOYEE/ LABOUR TURNOVER

- **Meaning** : -

Employee turnover or labour turnover in an organisation is the rate of change in the composition of employee force during a specified period measured against a suitable index.



DETAIL EXPLANATION

Method	Formula
Replacement Method	$\frac{\text{Number of employees Replaced during the period}}{\text{Average number of employees during the period}} \times 100$
	Note : Replacement do not includes new joinees on account of expansion.
Separation Method	$\frac{\text{Number of employees Separated during the period}}{\text{Average number of employees during the period}} \times 100$
	Note : Separation means no. of employees left and discharged.

Flux Method	$\frac{\text{Number of employees Separated + Replaced during the period}}{\text{Average number of employees during the period}} \times 100$
Flux with new Recruitment	$\frac{\text{No. of employees Separated+Replaced+Newly Joined during the period}}{\text{Average number of employees during the period}} \times 100$
	Alternatively,
	$\frac{\text{No.of Separations + No.of Accessions}}{\text{Average number of employees during the period}} \times 100$
Note: Some Management Accountants consider New Recruited employees as part of turnover and some do not. It depends on Company Policy also.	

Average no. of employees
$\frac{\text{No. of employees at the beginning + No. of employees at the end of the period}}{2}$
Equivalent Employee Turnover Rate
Annualizing the turnover rate :
Employee turnover for the period (quarter, month, day) × (4 or 12 or 365)

Que 14 SM Illustration 14 Notebook Page no.

The Accountant of Y Ltd. has computed employee turnover rates for the quarter ended 31st March, 20X1 as 10%, 5% and 3% respectively under 'Flux method', 'Replacement method' and 'Separation method' respectively. If the number of workers replaced during that quarter is 30, find out the number of workers for the quarter (i) recruited and joined and (ii) left and discharged and (iii) Equivalent employee turnover rates for the year.

Cost Associated :

- **Preventive Costs**: Cost to prevent turnover like Medical Benefits, Wage hike etc.
- **Replacement Costs**: Cost due to turnover – recruitment, training etc.

Cause and Effects :

Causes	Remarks	Effects
Personal Cause	Change, ill, family problem, discontent	Disturbance in flow of
	work env.	production

Causes	Remarks	Effects
Unavoidable Cause	Seasonal, input shortage, location change, disability	Low efficiency of new workers
Avoidable Cause	Dissatisfaction of job, hours, supervisor, training, facilities, low wages	Increased cost of training, cost of recruitment

Que 15 SM Illustration 15 Notebook Page no.

The management of B.R Ltd. is worried about their increasing employee turnover in the factory and before analyzing the causes and taking remedial steps, it wants to have an idea of the profit foregone as a result of employee turnover in the last year.

Last year sales amounted to Rs. 83,03,300 and P/V ratio was 20 per cent. The total number of actual hours worked by the direct employee force was 4.45 lakhs. The actual direct employee hours included 30,000 hours attributable to training new recruits, out of which half of the hours were unproductive. As a result of the delays by the Personnel , Department in filling vacancies due to employee turnover 1,00,000 potentially productive hours (excluding unproductive hours) were lost.

The costs incurred consequent on employee turnover revealed, on analysis, the following:

Settlement cost due to leaving	Rs. 43,820
Recruitment costs	Rs. 26,740
Selection costs	Rs. 12,750
Training costs	Rs. 30,490

Assuming that the potential production lost as a consequence of employee turnover could have been sold at prevailing prices, find the profit foregone last year on account of employee turnover.

Chapter 4

OVERHEADS

Overheads

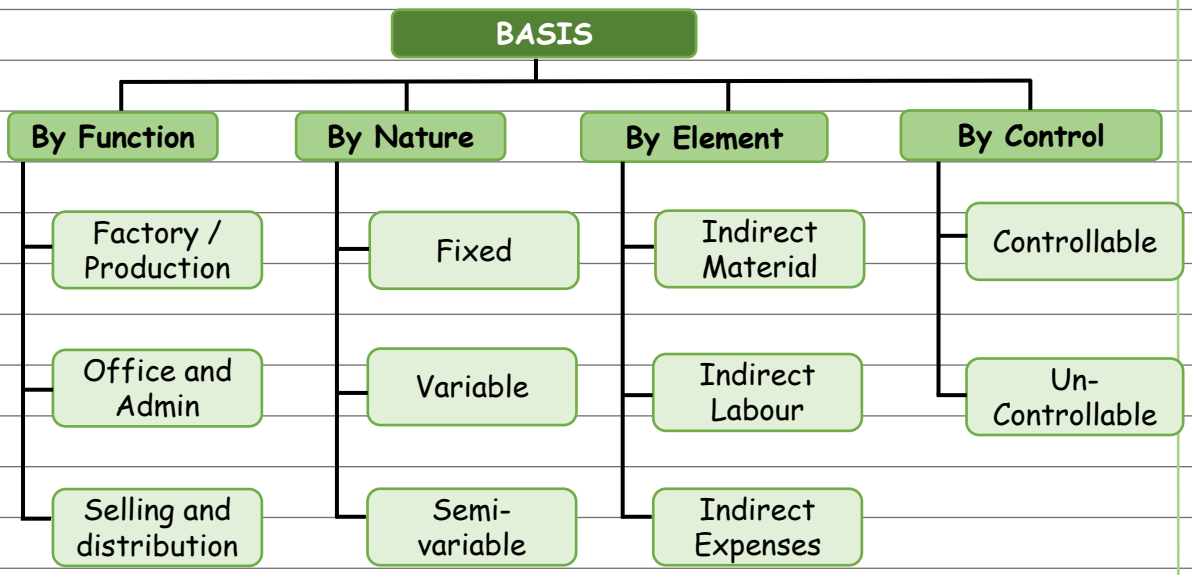
Past Trends:-

Nov 18	May 19	Nov 19	Nov 20	Jan 21	Jul 21	Dec 21	May 22
10	5	10	10	10	5	10	10

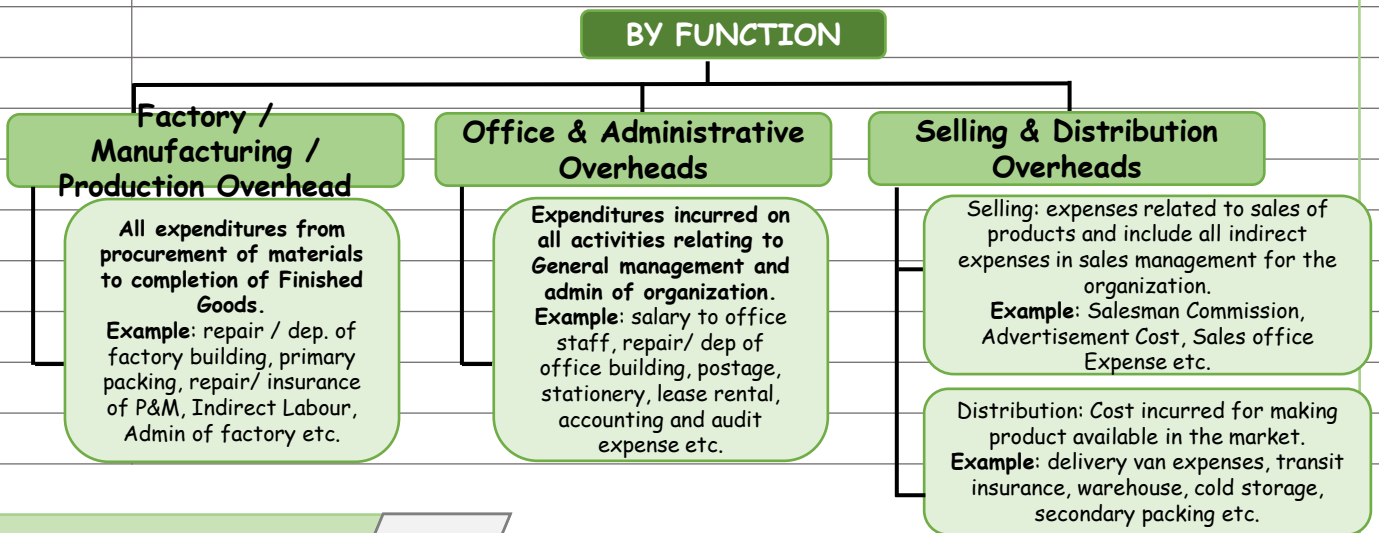
OVERHEADS

- Overheads are the expenditure which cannot be conveniently traced to or identified with any cost object under consideration ;
- Expenses on services that facilitate or make possible the carrying out of the production process ;
- By themselves, these services are not of any use.

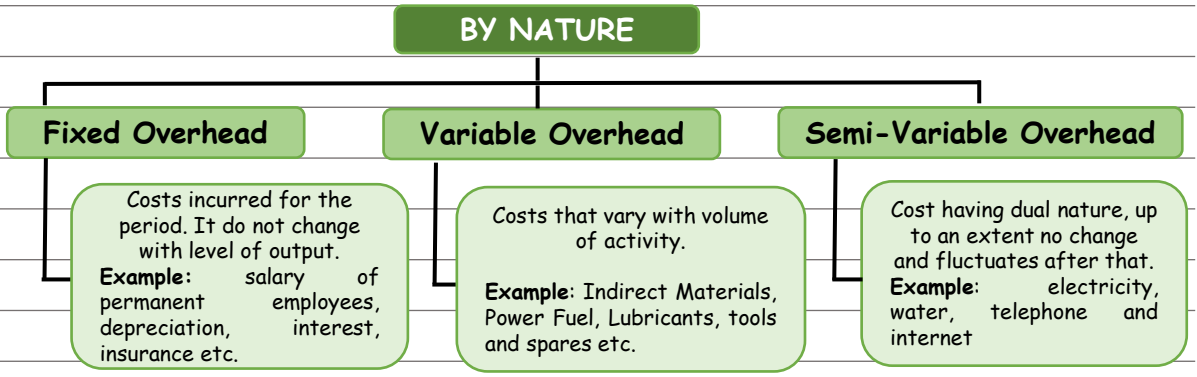
CLASSIFICATION OF OVERHEADS



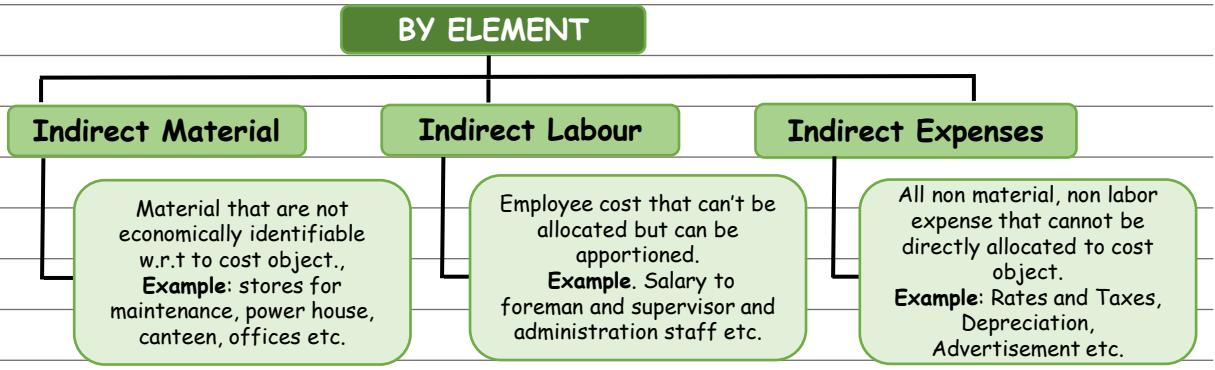
CLASSIFICATION BY FUNCTION



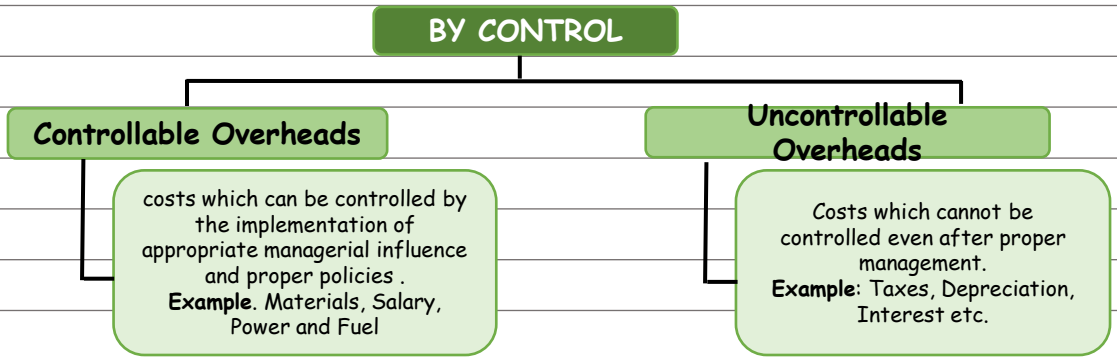
CLASSIFICATION BY NATURE



CLASSIFICATION BY ELEMENTS.



CLASSIFICATION BY CONTROL



ACCOUNTING OF MANUFACTURING /PRODUCTION OVERHEADS

- Steps in Distribution of Overheads to Cost Object :

  Step 1: Estimation and Collection of Overheads ;

  Step 2: Assignment of overheads to production cost centers :-

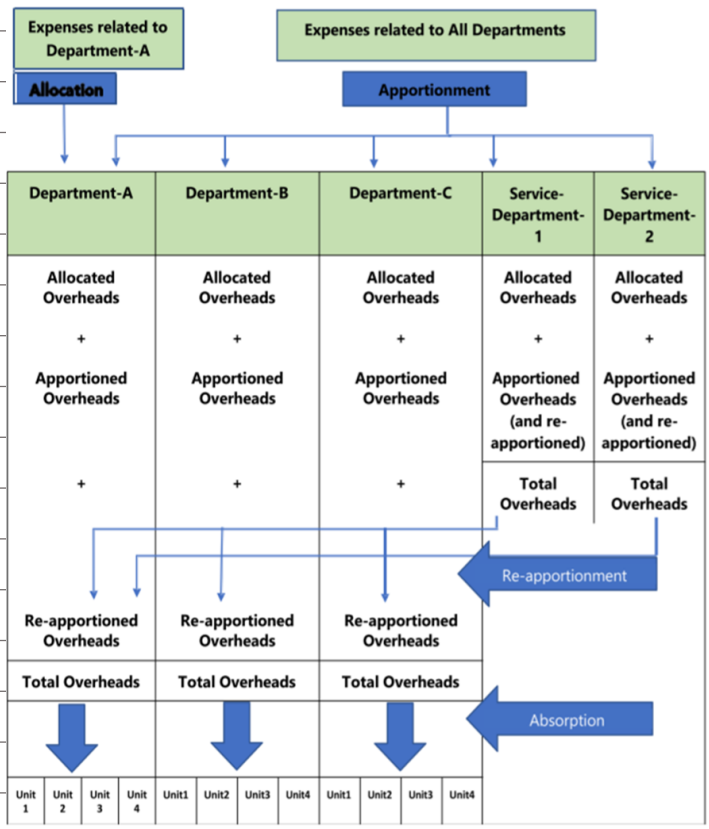
  (a) Allocation & Apportionment (Primary Distribution) ;

  (b) Reapportionment (Re-distribution) ;

Step 3: Absorption or charging of Overheads.

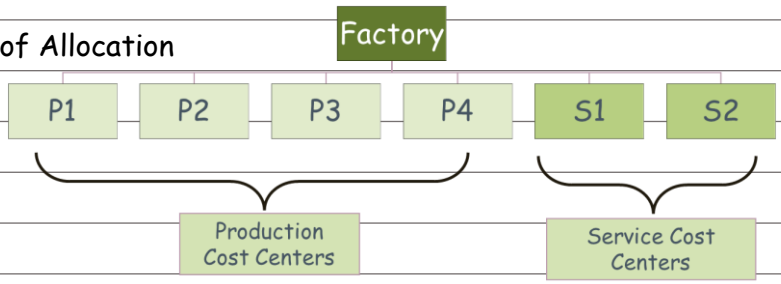
VARIOUS TERMS AND THEIR MEANINGS

Term	Explanation
Estimation / Collection	By using sources like invoices, stores requisition, wage analysis book, journal entries.
Cost Allocation	Direct assignment of cost to a cost object which can be traced directly.
Cost Apportionment	Some estimated overheads cannot be directly assigned, such expenses are to be apportioned. Apportionment : the allotment of proportions of items of cost to cost centres or departments
Re - apportionment	Those departments which do not directly take part in the production of goods or providing services. Example - engineering, quality control and assurance, laboratory, canteen, stores, time office, dispensary
Absorption	process of recovering overheads of a department or any other cost center from its output is called recovery or absorption.



ALLOCATION

- It may, sometime, become necessary to sub-divide a manufacturing organization into several cost centers, so that a closer distribution of expenses and a more detailed control is practicable. Costs related to similar nature is allocated to their respective cost center.
- Diagrammatic presentation of Allocation



DIRECT ALLOCATION

- Cost which is specifically related to a particular cost centre should be directly allocated to respective cost centre

APPORTIONMENT

- For some of the indirect costs/ overheads, direct allocation is not possible. In that case, we do apportionment on appropriate basis:

Type of Overhead Cost	Basis of Apportionment
Rent and other building expenses, Lighting and heating (conditioning), Fire precaution service, Air- conditioning	floor area, volume of department
Perquisites, Labour welfare expenses, Time keeping, Personnel office Supervision	Number of workers
Compensation to workers, Holiday pay, ESI and PF, contribution, Perquisites	Direct Wages
Depreciation of plant and machinery, Repairs and maintenance of plant and machinery, Insurance of stock	Capital Values
Power/steam consumption, Internal transport, Managerial salaries	Technical estimates

- For some of the indirect costs/ overheads, direct allocation is not possible. In that case, we do apportionment on appropriate basis:

Type of Overhead Cost	Basis of Apportionment
Electric power (machine operation)	Horse power of machines, or Number of machine hour, or Product of HP and Machine Hrs.
Lighting expenses (light)	No. of light points, or Area or Metered units
Material handling, Stores overhead	Weight of materials, or volume of materials, or value of materials or unit of materials.
General Overhead	Direct labour hour, or Machine hours

Example 1

AXY Ltd is a manufacturing company having three production departments P, Q and R and two service departments X and Y. The following estimated data is available for Nov 2021:

	P	Q	R	X	Y
Area (sq. ft.)	500	500	1000	250	250
Capital value of asset (lakh)	40	30	20	6	4
Machine Hours	200	600	200	100	0
Manpower of machines	60	30	50	50	0
Number of light points	10	12	20	8	10

- Details of factory overheads :
  - Power: 50000
  - Rent: 75000
  - Lighting charges: 18000
- Apportion these overheads on various departments.

RE-APPORTIONMENT

- When all the costs are allocated/ apportioned to cost centers, next step is to distribute costs allocated to **service cost centers to production cost centers** which is called **Re-apportionment**.

Type of Overhead Cost	Basis of Re-Apportionment
Maintenance & repair Shop ;	Direct Labour hours, Machine Hours, Direct
Planning & Progress ;	Labour wages , Asset value x Hours worked
Tool Room ;	
Canteen & Welfare ;	No. pf direct workers, No. of employee

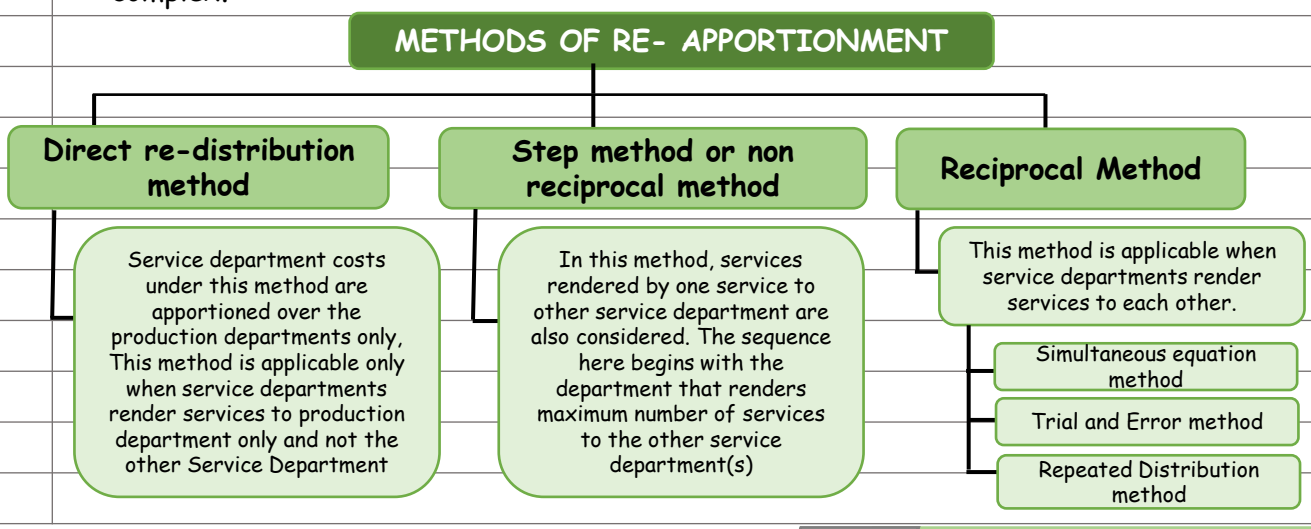
Hospital & Dispensary	
Personnel Department	
Time Keeping	No. of card punched , No. of Employees
Computer Section	Computer hours , Specific allocation to dept.

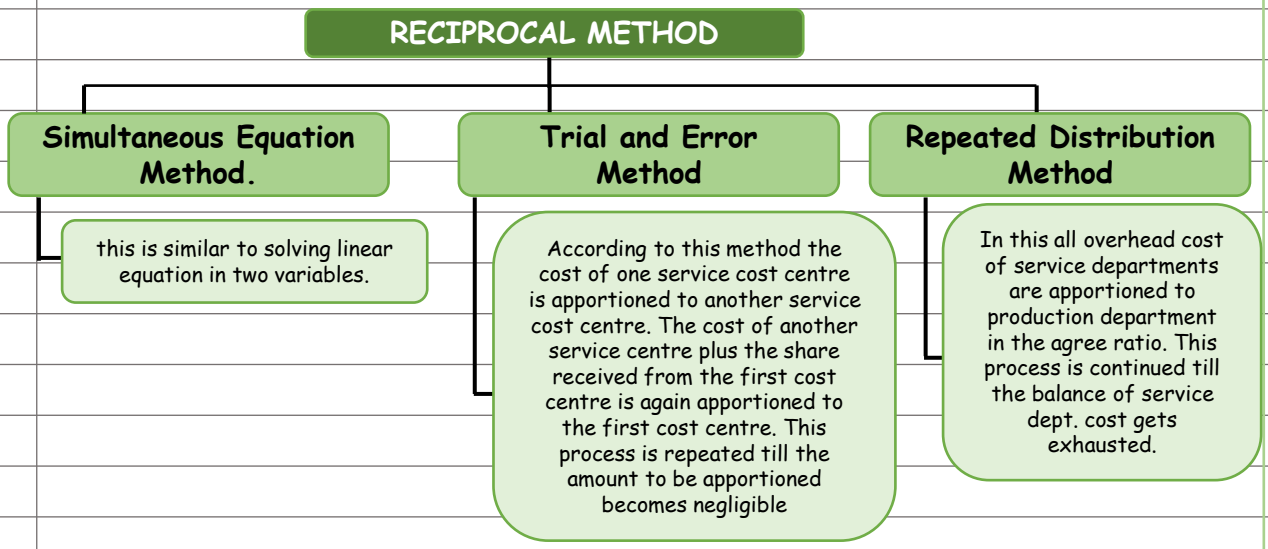
- When all the costs are allocated/ apportioned to cost centers, next step is to distribute costs allocated to **service cost centers to production cost centers** which is called Re-apportionment

Type of Overhead Cost	Basis of Re-Apportionment
Power House (electric lighting cost)	Floor area , cubic content, no. of electric Points, Wattage.
Power House (electric power cost)	House power ,Kwh, horse power X machine hrs. , Kwh X Machine hrs.
Stores dept.	No. of requisitions ,weight or value of material issued.
Transport dept.	Crane hours ,truck hours , truck mileage ,truck tonnage, truck ton-hours , tonnage handled, No. of Package of standard Size.
Fire Protection	Capital values
Inspection	Inspection hours.

- Re-Apportionment of Service Departments' Cost to Production Cost Center/ Department is done by direct redistribution distribution based on appropriate basis.

- But, in case one service department is giving service to another, calculations will be complex.





Que 1 | SM Illustration 1 | Notebook Page no.

XL Ltd. has three production departments and four service departments. The expenses for these departments as per Primary Distribution Summary are as follows

Production Departments:	(₹)	(₹)
Dept- A	30,00,000	
Dept- B	26,00,000	
Dept-C	24,00,000	80,00,000
Service Department:	(₹)	(₹)
Stores	4,00,000	
Time-keeping and Accounts	3,00,000	
Power	1,60,000	
Canteen	1,00,000	9,60,000

The following information is also available in respect of the production departments:

	Dept. A	Dept. B	Dept.C
Horse power of Machine	300	300	200
Number of workers	20	15	15
Value of stores requisition in (₹)	2,50,000	1,50,000	1,00,000

PREPARE a statement apportioning the costs of service departments over the production departments using direct re-distribution method.

Que 2 | SM Illustration 2 | Notebook Page no.

Suppose the expenses of two production departments A and B and two service departments X and Y are as under:

Department	Amount	Apportionment Basis		
	(₹)	Y	A	B
Dept. X	2,00,000	25%	40%	35%
Dept. Y	1,50,000	--	40%	60%
Dept. A	3,00,000			
Dept. B	3,20,000			

PREPARE a statement apportioning the costs of service departments over the production departments using step method.

Example 2 | Notebook Page no.

Suppose the expenses of two production departments A and B and two service departments X and Y are as under:

Dept.	Amount	Apportionment Basis			
	(₹)	X	Y	A	B
Dept. X	2,00,000	NA	25%	40%	35%
Dept. Y	1,50,000	10%	NA	40%	50%
Dept. A	3,00,000				
Dept. B	3,20,000				

PREPARE a statement apportioning the costs of service departments over the production departments using all reciprocal methods.

Que 3 | SM Illustration 3 | Notebook Page no.

Service Departments expenses:-	₹
Boiler house	3,00,000
Pump Room	60,000
Total	3,60,000

The allocation basis is:

	Production Department		Service Department	
	A	B	Boiler House	Pump Room
Boiler House	60%	35%	-	5%
Pump Room	10%	40%	50%	-

Que 4 | SM Illustration 4 | Notebook Page no.

Sanz Ltd. is a manufacturing company having three production departments, 'A', 'B' and 'C' and two service departments 'X' and 'Y'. The following is the budget for December 2021:

	Total (₹)	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Direct material		1,00,000	2,00,000	4,00,000	2,00,000	1,00,000
Direct wages		5,00,000	2,00,000	8,00,000	1,00,000	2,00,000
Factory rent	4,00,000					
Power	2,50,000					
Depreciation	1,00,000					
Other Overhead	9,00,000					

Additional Information:

Area (sq. ft.)	500	250	500	250	500
Capital value of assets (₹ lakhs)	20	40	20	10	10
Machine hours	1,000	2,000	4,000	1,000	1,000
Horse power of machines	50	40	20	15	25

A technical assessment of the apportionment of expenses of service departments is as under:

	A	B	C	X	Y
Service Dept. 'X' (%)	45	15	30	-	10
Serivce Dept. 'Y' (%)	60	35	-	5	-

Required:

(i) PREPARE a statement showing distribution of overheads to various departments.

(ii) PREPARE a statement showing re-distribution of service departments expenses to production departments using Trial and error method.

Que 5 | SM Illustration 5 | Notebook Page no.

Taking all the information from Illustration 4 above, PREPARE a statement showing re-distribution of service departments' expenses to production departments using repeated distribution method. Also CALCULATE machine hour rates of the production departments 'A', 'B' and 'C'.

Que 6 | SM Exercise Que 3 | Notebook Page no.

Deccan Manufacturing Ltd., have three departments which are regarded as production

departments. Service departments' costs are distributed to these production departments using the "Step Ladder Method" of distribution. Estimates of factory overhead costs to be incurred by each department in the forthcoming year are as follows. Data required for distribution is also shown against each department:

Department	Factory Overhead (₹)	Direct Labour hours	No. of employees	Area in sq. m.
Production :				
X	1,93,000	4,000	100	3,000
Y	64,000	3,000	125	1,500
Z	83,000	4,000	85	1.500
Service :				
P	45,000	1,000	10	500
Q	75,000	5,000	50	1,500
R	1,05,000	6,000	40	1,000
S	30,000	3,000	50	1,000

The overhead costs of the four service departments are distributed in the same order, viz., P, Q, R and S respectively on the following basis.:

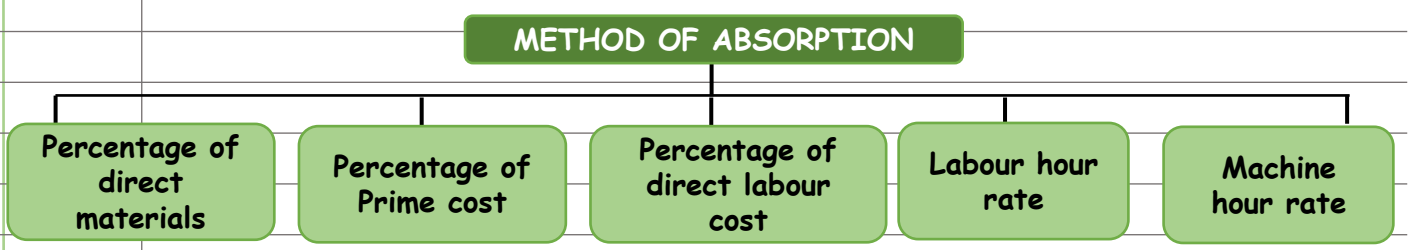
Department	Basis
P	Number of employees
Q	Direct labour hours
R	Area in square meters
S	Direct labour hours

You are required to:

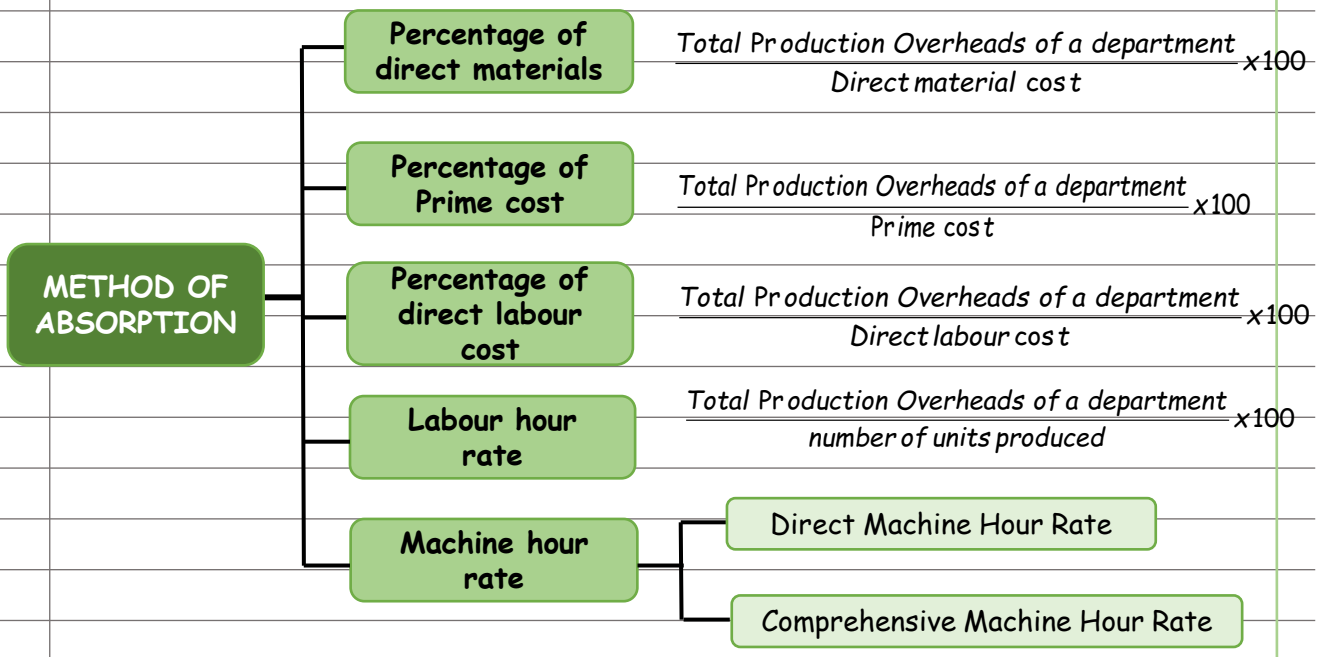
(a) PREPARE a schedule showing the distribution of overhead costs of the four service departments to the three production departments; and

(b) CALCULATE the overhead recovery rate per direct labour hour for each of the three production departments.

METHODS OF ABSORPTION OF OVERHEADS



Overheads



DIRECT MACHINE HOUR RATE

- When each machine or group of machines is treated as a cost centre, overheads apportioned to a production department are further apportioned to machines or group of machines.

- These apportioned costs are divided by the estimated productive machine hour of that machine to get machine hour rate.

- Formula: $\frac{\text{Cost apportioned to machine}}{\text{Estimated Productive machine hours of that machine}}$

Comprehensive Machine Hour Rate

- When a single rate is used for entire dept/ cost centre.
- here estimated overheads of department are divided by entire machine hours of department
- Formula: $\frac{\text{Estimated overheads of Department/ Cost Centre}}{\text{Estimated Productive machine hours of department}}$

Que 7	SM Illustration 7	Notebook Page no.
	A machine shop cost center contains three machines of equal capacities. To operate these three machines nine operators are required i.e. three operators on each machine. Operators are paid ₹20 per hour. The factory works for forty eight hours in a week . which includes 4 hours set up time. The work is jointly done by operators. The operators are paid fully for the forty eight hours. In additions they are paid a bonus of 10 per cent of productive time. Costs are reported for this company on the basis of thirteen four-weekly period.	
	The company for the purpose of computing machine hour rate includes the direct wages of the operator and also recoups the factory overheads allocated to the machines. The following details of factory overheads applicable to the cost center are available:	
	▪ Depreciation 10% per annum on original cost of the machine. Original cost of the each machine is ₹52,000.	
	▪ Maintenance and repairs per week per machine is ₹60.	
	▪ Consumable stores per week per machine are ₹75.	
	▪ Power: 20 units per hour per machine at the rate of 80 paise per unit. No power is used during the set-up hours.	
	▪ Apportionment to the cost centre: Rent per annum ₹5,400, Heat and Light per annum ₹9,720, foreman's salary per annum ₹12,960 and other miscellaneous expenditure per annum ₹18,000.	
	Required:	
	CALCULATE the cost of running one machine for a four-week period	

Que 8	SM Illustration 6	Notebook Page no.
	A machine costing ₹1,00,00,000 is expected to run for 10 years. At the end of this period its scrap value is likely to be ₹9,00,000. Repairs during the whole life of the machine are expected to be ₹18,00,000 and the machine is expected to run 4,380 hours per year on the average. Its electricity consumption is 15 units per hour, the rate per unit being ₹5. The machine occupies one-fourth of the area of the department and has two points out of a total of ten for lighting. The foreman has to devote about one sixth of his time to the machine. The monthly rent of the department is ₹30,000 and the lighting charges amount to ₹ 8,000 per month. The foreman is paid a monthly salary of ₹ 19,200.	
	FIND OUT the machine hour rate, assuming insurance is @ 1% p.a. on ₹1,00,00,000 and the expenses on oil, etc., are ₹900 per month.	

Que 9	SM Exercise Que 6	Notebook Page no.
	Job No. 198 was commenced on October 10, 2021 and completed on November 1, 2021. Materials used were ₹6,000 and labour charged directly to the job was ₹4,000. Other information is as follows:	
	Machine No. 215 used for 40 hours, the machine hour rate being 35.	
	Machine No. 160 used for 30 hours, the machine hour rate being ₹40. Six welders worked on the job for five days of 8 hours each: the Direct labour hour per welder is ₹ 20.	
	General expenses related to production not included for calculating either the machine . hour or direct labour hour rate totaled ₹20,000, total direct wages for the period being ₹2,00,000. COMPUTE the works costs for job No. 198.	

Que 10	SM Exercise Que 5	Notebook Page no.
	A machine shop has 8 identical Drilling machines manned by 6 operators. The machine cannot be worked without an operator wholly engaged on it. The original cost of all these machines works out to ₹8 lakhs.	
	These particulars are furnished for a 6 months period:	
	Normal available hours per month	208
	Absenteeism (without pay) hours	18
	Leave (with pay) hours	20
	Normal idle time unavoidable-hours	10
	Average rate of wages per worker for 8 hours a day.	₹ 800
	Production bonus estimated	15% on wages
	Value of power consumed	₹80,500
	Supervision and indirect labour	₹33,000
	Lighting and electricity	₹12,000
	These particulars are for a year	
	Repairs and maintenance including consumables-	3% of value of machines.
	Insurance-	₹ 40,000
	Depreciation-	10% of original cost.
	Other sundry works expenses-	₹ 12,000
	General management expenses allocated-	₹54,530
	You are required to COMPUTE a comprehensive machine hour rate for the machine shop.	

Que 11	SM Exercise Que 4	Notebook Page no.
	Gemini Enterprises undertakes three different jobs A, B and C. All of them require the use of a special machine and also the use of a computer. The computer is hired and the hire charges work out to ₹ 4,20,000 per annum. The expenses regarding the machine are	

estimated as follows:

	(₹)
Rent for a quarter	17,500
Depreciation per annum	2,00,000
Indirect charges per annum	1,50,000

During the first month of operation the following details were taken from the job register:

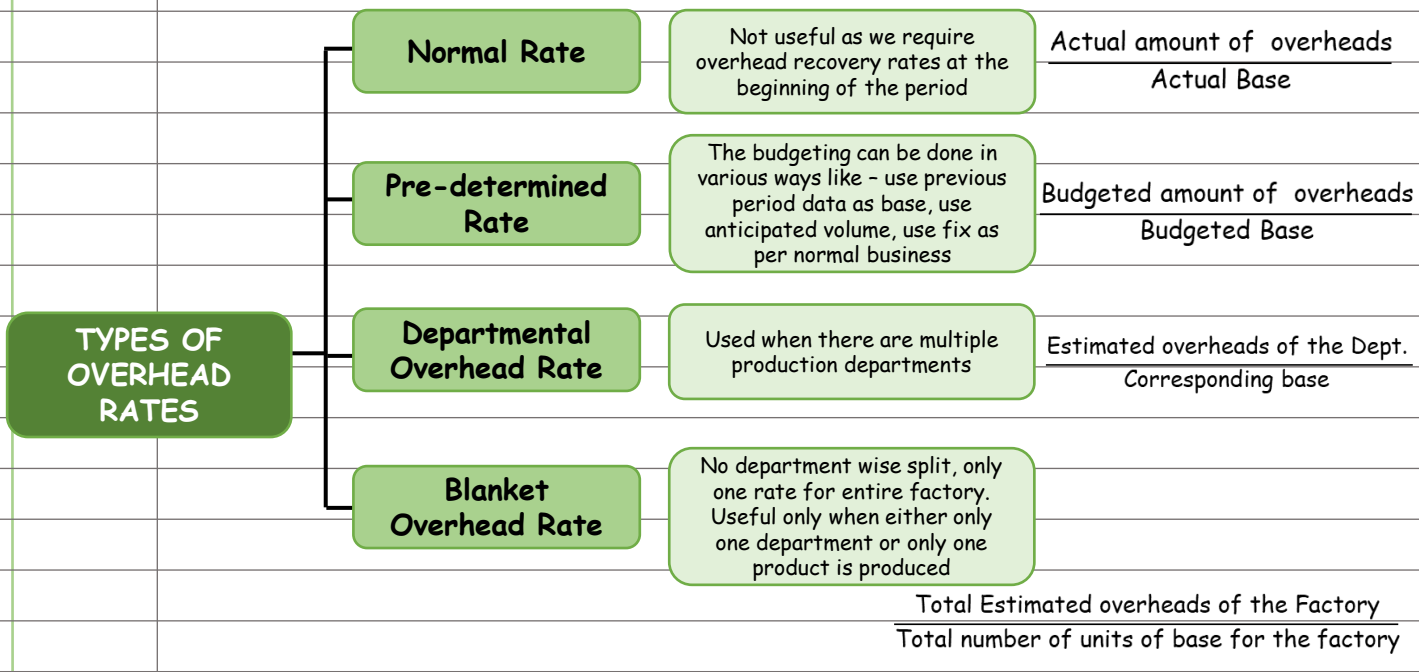
	Job		
	A	B	C
Number of hours the machine was used:			
(a) Without the use of the computer	600	900	—
(b) With the use of the computer	400	600	1,000

You are required to COMPUTE the machine hour rate:

(a) For the firm as a whole for the month when the computer was used and when the computer was not used.

(b) For the individual jobs A, B and C.

TYPES OF OVERHEAD RATES



UNDER-ABSORBED & OVER ABSORBED OVERHEADS

- Difference between Overhead Expenses Incurred and Overhead Absorbed Recovered is known as Under /Over Absorption.

- If Overheads incurred is more than overheads absorbed then it is known as Under Absorption.

- If Overheads incurred is less than overheads absorbed then it is known as Over Absorption

Example 3

Given data for a production department for a month [Department use Direct Labour Hours as basis of recovery of overheads]

Budgeted Overheads = Rs. 200,000, Budgeted Direct Labour Hours = 2500

Above rate was decided before the start of the month and will be used for the month as overhead rate on every job or product produced.

Calculate the pre-determined overhead rate and find the amount of under/ over absorption of overheads in each case given in the below table.

Example 4

Case	Actual Overheads	Actual Labour hours	Overheads Recovered	Actual Overhead Rate	Under or Over Recovery	Reason
1	2,00,000	2,000				
2	2,20,000	2,500				
3	2,20,000	2,000				
4	2,20,000	2,750				
5	1,80,000	2,500				
6	2,00,000	2,700				
7	1,80,000	2,750				
8	1,80,000	2,250				

REASONS OF UNDER/ OVER ABSORPTION

Variation in Base	Variation in Overheads	Proportion of change in each other	Impact
Nil	Increase	NA	Under Absorption
Nil	Decrease	NA	Over Absorption
Increase	Nil	NA	Over Absorption
Decrease	Nil	NA	Under Absorption
Increase/ decrease	Increase/ decrease	Disproportionate	Either Under or Over (depends)
Increase / decrease	Increase / decrease	Proportionate and Same Direction	No impact

TREATMENT OF UNDER-ABSORBED AND OVER-ABSORBED OVERHEADS

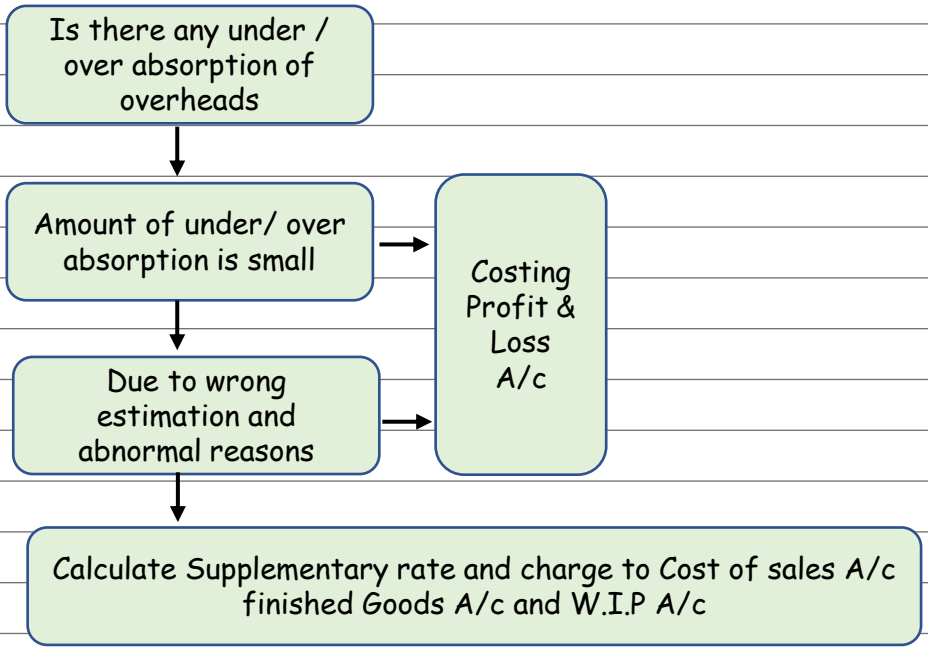
- If difference under/ over absorption is very large it would be desirable to adjust the cost of products manufactured, as otherwise the cost figures would be unreasonable and misleading.

- The adjustment to the cost can be made by using supplementary overhead rate.

- Production of any period can be identified in the three forms
  - ❑ Goods finished and sold
  - ❑ Goods finished and held in stock (not yet sold)
  - ❑ Goods semi-finished (WIP)

Type of Goods	Cost Account Name
Goods finished and sold	Cost of Sales A/c
Goods finished and held in stock (not yet sold	Finished Goods A/c
Semi-finished (WIP)	WIP A/c

- Further Treatment if nature of it is normal or abnormal



Supplementary Rate will be calculated as follows:

$$\frac{\textit{Under / Over Absorbed OH to be charged to cost accounts}}{\textit{Units Produced}}$$

Que 12	SM Exercise Que 8	Notebook Page no.

In a manufacturing unit, factory overhead was recovered at a pre-determined rate of ₹ 25 per man-day. The total factory overhead expenses incurred and the man-days actually worked were ₹ 41.50 lakhs and 1.5 lakh man-days respectively. Out of the 40,000 units produced during a period, 30,000 were sold.

On analyzing the reasons, it was found that 60% of the unabsorbed overheads were due to defective planning and the rest were attributable to increase in overhead costs.

EXPLAIN how would unabsorbed overheads be treated in Cost Accounts?

Que 13	SM Exercise Que 7	Notebook Page no.

In a factory, overheads of a particular department are recovered on the basis of ₹ 5 per machine hour. The total expenses incurred and the actual machine hours for the department for the month of August were ₹80,000 and ₹10,000 hours respectively. Of the amount of ₹80,000, ₹15,000 became payable due to an award of the Labour Court and ₹5,000 was in respect of expenses of the previous year booked in the current month (August). Actual production was 40,000 units, of which 30,000 units were sold. On analyzing the reasons, it was found that 60% of the under-absorbed overhead was due to

defective planning and the rest was attributed to normal cost increase. SHOW the treatment of over/under-absorbed overhead in the cost accounts?

Que 14	SM Exercise Que 11	Notebook Page no.

ABC Ltd. manufactures a single product and absorbs the production overheads at a pre-determined rate of ₹ 10 per machine hour.

At the end of current financial year, it has been found that actual production overheads incurred were ₹6,00,000. It included ₹ 45,000 on account of 'written off' obsolete stores and ₹30,000 being the wages paid for the strike period under an award.

The production and sales data for the current year is as under: Production :

Finished goods	20,000 units
Work-in-progress	8,000 units
(50% complete in all respects)	
Sales :	
Finished goods	18,000 units

The actual machine hours worked during the period were 48,000. It has been found that one-third of the under-absorption of production overheads was due to lack of production planning and the rest was attributable to normal increase in costs.

(i) CALCULATE the amount of under-absorption of production overheads during the current year; and

(ii) SHOW the accounting treatment of under-absorption of production overheads.

Que 15	SM Illustration 8	Notebook Page no.

The total overhead expenses of a factory is ₹ 4,46,380. Taking into account the normal working of the factory, overhead was recovered in production at ₹ 1.25 per hour. The actual hours worked were 2,93,104. STATE how would you proceed to close the books of accounts, assuming that besides 7,800 units produced of which 7,000 were sold, there were 200 equivalent units in work-in-progress?

On investigation, it was found that 50% of the unabsorbed overhead was on account of increase in the cost of indirect materials and indirect labour and the remaining 50% was increase in the cost of indirect materials and indirect labour and the remaining 50% was due to factory inefficiency.

ACCOUNTING OF OTHER OVERHEADS

ADMINISTRATIVE OVERHEADS

- Meaning :
  - ❑ The sum of those costs of general management and of secretarial accounting and administrative services,
  - ❑ Which cannot be directly related to the production, marketing, research or development functions of the enterprise.

ACCOUNTING OF ADMIN OVERHEADS

- **Apportioning Admin Overheads between Production and Sales Department :**
  - ❑ **Logic**: administrative overheads are incurred for the benefit of both of these departments.
  - ❑ Here, administrative overheads **lose their identity** and get **merged** with production and selling and distribution overheads.
  - ❑ **Disadvantages :**
    - Difficult to find suitable base for apportionment.
    - Lot of clerical work
    - Not justified to apportion all admin OH to production and sales only when other departments are also there.

- **Charging to Profit and Loss Account:**
  - ❑ **Logic**: the administrative overheads are concerned with the formulation of policies and thus are not directly concerned with either the production or the selling and distribution functions.
  - ❑ **Logic**: Apportionment was difficult due to lack of suitable base and these OH are fixed.
  - ❑ **Disadvantages :**
    - Cost of products is understated as administrative overheads are not charged to costs.
    - The exclusion of administrative overheads from cost of products is against sound accounting principle.

- **Treating Administrative Overheads as a separate addition to Cost of Production/ Sales :**
  - ❑ **Logic**: This method considers administration as a separate function like production

and sales.

- Costs relating to formulating the policy, directing the organization and controlling the operations are taken as a **separate charge to the cost of the jobs** or a product, sold along with the cost of other functions.
- **Bases generally used absorb Admin OH to Job or Product :**
  - -- Works Cost
  - -- Sales Value/ Quantity
  - -- Gross Profit
  - -- Quantity Produced
  - -- Conversion Cost etc.

Example 4

The Budgeted expenses for the year are as follows:

Direct Material	Rs.9,000
Direct Wages @ Rs.10 per hour	Rs. 20,000
Direct Expenses	Rs.1,000
Works Overheads	Rs.5,000
Administrative Overheads	Rs.3,500

Work overheads are charged at labour hour rate and administration overehads are charged as a percentage on work cost.

The details of Job are as follows

Direct Material	Rs.2,250
Direct Wages	Rs. 5,000
Direct expenses	Rs.250

Calculate :

a. Calculate rate of absorption of administration overheads

b. What price should be charged to Job to earn 1/6th profit on sale.

Que 16 SM Illustration 9 Notebook Page no.

In an engineering company, the factory overheads are recovered on a fixed percentage basis on direct wages and the administrative overheads are absorbed on a fixed percentage basis on factory cost.

The company has furnished the following data relating to two jobs undertaken by it in a period:

	Job 101	Job 102
	(₹)	(₹)
Direct Material	54,000	37,500
Direct Wages	42,000	30,000
Selling Price	1,66,650	1,28,250
Profit Percentage on Total Cost	10%	20%

Required:

(i) COMPUTATION of percentage recovery rates of factory overheads and administrative overheads.

(ii) CALCULATION of the amount of factory overheads, administrative overheads and profit for each of the two jobs.

(iii) Using the above recovery rates DETERMINE the selling price of job 103. The additional data being:

Direct materials	₹ 24,000
Direct wages	₹ 20,000
Profit percentage on selling price	12-½%

SELLING AND DISTRIBUTION OVERHEADS

- Meaning :
  - ❑ Selling cost or overhead expenses are the expenses incurred for the purpose of promoting the marketing and sales of different products.
  - ❑ Distribution expenses, on the other hand, are expenses relating to delivery and dispatch of goods sold.

ACCOUNTING OF S&D OVERHEADS

There are various bases on which S&D can be distributed :

- **Sales value of Goods Sold:** It is considered that the sale value is ordinarily the most **logical basis**, there being some connection between the amount of sales and the amount of expenses incurred to achieve them.

- **Cost of Goods Sold**: COGS however, is **not as satisfactory basis** as it may not have any direct relationship with the selling and distribution cost.

- Gross Profit on Sales: The basis of gross profit on sales results in a larger share of the

selling overhead being applied to goods yielding a large margin of profit and vice versa. The basis therefore follows the principle of 'ability to pay, it may not reflect costs or incurred efforts.

- **Estimated amount per unit:** The best method for absorbing selling and distributing expenses over various products is to separate fixed expenses from variable expenses.

  - ❑ **Fixed Expenses:** Apportion the fixed expenses according to the benefit derived by each product and thus ascertaining the fixed expenses per unit.

  - ❑ **Variable Expenses:** These are expenses which are variable per unit of sale so it can be directly charged (similar to direct cost) **Examples**: Packaging, freight outwards, insurance in transit, commission to salesman, discount/ rebate to customers etc.

Que 17 | SM Illustration 10 | Notebook Page no.

A company which sells four products, some of these are unprofitable. Company proposes to discontinue to sale one of these products. The following information is available regarding income, costs and activity for the year ended 31st March.

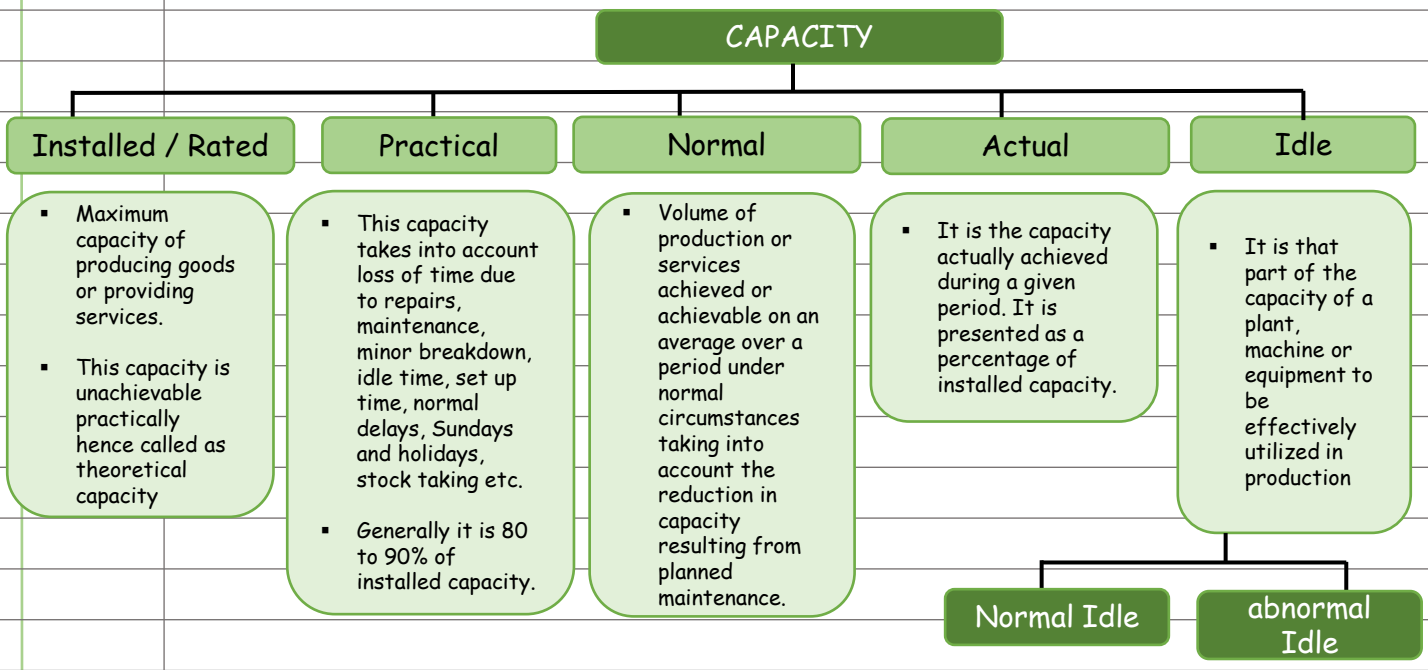
	Products			
	A	B	C	D
Sales (₹)	30,00,000	50,00,000	25,00,000	45,00,000
Cost of goods sold(₹)	20,00,000	45,00,000	21,00,000	22,50,000
Area of storage (Sq.)	50,000	40,000	80,000	30,000
No. of parcels	1,00,000	1,50,000	75.000	1,75,000
No. of Invoices sent	80,000	1,40,000	60,000	1,20,000

Selling and distribution overheads and the basis of allocation are:

	Amount (₹)	Basis of allocation to products
Fixed Costs		
Rent & Insurance	3,00,000	Area of storage (Sq.ft)
Depreciation	1,00,000	No. of parcels sent
Salesmen's Salaries & expenses	6,00,000	Sales volume
Administrative wages & Salaries	5,00,000	No. of invoices sent
Variable Costs:		
Packing wages & material	Rs.2 per parcel	

Commission	4% of sales	
Stationery	₹1 per invoice	

You are required to PREPARE Costing Profit & Loss Statement, showing the percentage of profit or loss to sales for each product.



IDLE CAPACITY

- **Normal Idle Capcaity:**
  - It is the difference between Installed capacity and Normal capacity.

- **Abnormal Idle Capacity :**
  - It is the difference between Normal capacity and Actual capacity utilization where the actual capacity is lower than the normal capacity.

- **Relationships :**
  - Installed Capacity – Normal Idle Capacity = Normal Capacity
  - Normal Capacity – Abnormal Idle Capacity = Actual Capacity

Example 5

A machinery purchased from a manufacturer who claimed that his machine could produce 36.5 tonnes in a year consisting of 365 days. Holidays, break-down, etc. were normally allowed in the factory for 65 days. Sales were expected to be 25 tonnes during the year and the plant actually produced 25.2 tonnes during the year. You are required to state the following figures:

1. Rated Capacity
2. Practical Capacity
3. Normal Capacity
4. Actual Capacity

MIX PROBLEMS

Que 18 SM Exercise Que 1 Notebook Page no.

The ABC Company has the following account balances and distribution of direct charges on 31st March

	total	Production Dept.		Service Dept.	
		Machine Shop	Packing	Gen. Plant	Store & Maintenanc.
	(₹)	(₹)	(₹)	(₹)	(₹)
Allocated Overheads:					
Indirect Labour	14,650	4,000	3,000	2,000	5,650
Maintenance material	5,020	1,800	700	1,020	1,500
Misc. Supplies	1,750	400	1,000	150	200
superintendent's salary	4,000	-	-	4,000	-
Cost & payroll salary	10,000	-	-	10,000	-
Overheads to be apportioned:					
Power	8,000				
Rent	12,000				
Fuel and heat	6,000				
Insurance	1,000				
Trade License fees	2,000				
Depreciation	1,00,000				
	1,64,420	6,200	4,700	17,170	7,350

The following data were compiled by means of the factory survey made in the previous year:

	Floor Area (Sq. ft.)	Radiator Sections	No. of employees	Investment (₹)	H.P hours
Machine Shop	2,000	45	20	6,40,000	3,500
Packing	800	90	10	2,00,000	500
General plant	400	30	3	10.000	-
Store & Maintenance	1,600	60	5	1,50,000	1,000
	4,800	225	38	10,00,000	5,000

Expenses charged to the stores and maintenance departments are to be distributed to the other departments by the following percentages:

Machine shop 50%; Packing 20%; General Plant 30%; General Plant overheads is distributed on the basis of number of employees:

(a) PREPARE an overhead distribution statement with supporting schedules to show computations and basis of distribution including distribution of the service departments expense to production departments.

(b) DETERMINE the service department distribution by the method of continued distribution (repeated distribution) through 3 cycles. Show all calculations to the nearest rupees.

Que 19 SM Exercise Que 2 Notebook Page no.

Modern Manufactures Ltd. has three Production Departments P1, P2, P3 and two Service Departments S1and S2 details pertaining to which are as under:

	P1	P2	P3	S1	S2
Direct wages (₹)	3,000	2,000	3,000	1,500	195
Working hours	3,070	4,475	2,419	-	-
Value of machines (₹)	60,000	80,000	1,00,000	5,000	5,000
H.P. of machines	60	30	50	10	-
Light points	10	15	20	10	5
Floor space (sq. ft.)	2,000	2,500	3,000	2,000	500

The following figures extracted from the Accounting records are relevant:

	(₹)
Rent and Rates	5,000
General lighting	600
Indirect Wages	1,939
Power	1,500
Depreciation on machines	10,000
Sundries	9,695

The expenses of the service departments are allocated as under:

	P1	P2	P3	S1	S2
S1	20%	30%	40%	-	10%
S2	40%	20%	30%	10%	-

DETERMINE the total cost of product X which is processed for manufacture in Departments P1, P2 and P3 for 4, 5 and 3 hours respectively, given that its Direct Material Cost is ₹50 and Direct Labour Cost is ₹30.

Que 20 SM Exercise Que 9 Notebook Page no.

A factory has three production departments. The policy of the factory is to recover the production overheads of the entire factory by adopting a single blanket rate based on the percentage of total factory overheads to total factory wages. The relevant data for a month are given below:

Department	Direct Material	Direct Wages	Factory overheads	Direct Labour hrs	Machine Hrs.
Budget:					
Machining	6,50,000	80,000	3,60,000	20,000	80,000
Assembly	1,70,000	3,50,000	1,40,000	1,00,000	10,000
Packing	1,00,000	70,000	1,25,000	50,000	-
Actual:					
Machining	7,80,000	96,000	3,90,000	24,000	96,000
Assembly	1,36,000	2,70,000	84,000	90,000	11,000
Packing	1,20,000	90,000	1,35,000	60,000	-

The details of one of the representative jobs produced during the month are as under:

Job No. CW 7083

Department	Direct material	Direct wages (₹)	Direct Labour hrs (₹)	Machine Hrs.
Machining	1,200	240	60	180
Assembly	600	360	120	30
Packing	300	60	40	-

The factory adds 30% on the factory cost to cover administration and selling overheads and profit.

(i) COMPUTE the overhead absorption rate as per the current policy of the company and determine the selling price of the Job No. CW 7083.

(ii) Suggest any suitable alternative method(s) of absorption of the factory .overheads and CALCULATE the overhead recovery rates based on the method(s) so recommended by

(iii) Determine the selling price of Job CW 7083 based on the overhead application rates

(iv) Calculate dept wise and total under/ over recovery in both scenarios (i) and (ii)

Que 21	SM Exercise Que 10	Notebook Page no.

A light engineering factory fabricates machine parts for customers. The factory commenced fabrication of 12 nos. machine parts as per customers' specifications, the expenditure incurred on the job for the week ending 21st August is as tabulated below:

	(₹)	(₹)
Direct Material (all items)		780.00
Direct labour (manual) 20 hours @ ₹15 per hour		300.00
Machine facilities:		
Machine No. I : 4 hours @ ₹45	180.00	
Machine No. II : 6 hours @ ₹65	390.00	570.00
Total		1650.00
Overheads @ ₹ 8 oer hours on 20 manual hours		160.00
Total Cost		1810.00

The overhead rate of ₹ 8 per hour is based on 3,000 man hours per week; similarly, the machine hour rates are based on the normal working of Machine Nos. I and II for 40 hours out of 45 hours per week.

After the close of each week, the factory levies a supplementary rate for the recovery of full overhead expenses on the basis of actual hours worked during the week. During the week ending 21st August, the total labour hours worked was 2,400 and Machine Nos. I and II had worked for 30 hours and 32.5 hours respectively.

PREPARE a Cost Sheet for the job for the fabrication of 12 nos. machine parts duly levying the supplementary rates.

Que 22	SM Exercise Que 12	Notebook Page no.

A Ltd., manufactures two products A and B. The manufacturing division consists of two production departments P1 and P2 and two service departments S1 and S2. Budgeted overhead rates are used in the production departments to absorb factory overheads to the products. The rate of Department P1 is based on direct machine hours, while the rate of Department P2 is based on direct labour hours.

For allocating the service department costs to production departments, the basis adopted is as follows:

(i) Cost of Department S1 to Department P1 and P2 equally, and

(ii) Cost of Department S2 to Department P1 and P2 in the ratio of 2 : 1 respectively.

The following data relating to factory overheads budgeted for the year is available:

Production Department		Service Department	
P1	P2	S1	S2
25,50,000	21,75,000	6,00,000	4,50,000

Budgeted output in units:

Product A 50,000; B 30,000.

Budgeted time required for production per unit:

Department P1	:	Product A : 1.5 machine hours
		Product B : 1.0 machine hour
Department P2	:	Product A : 2 Direct labour hours
		Product B : 2.5 Direct labour hours

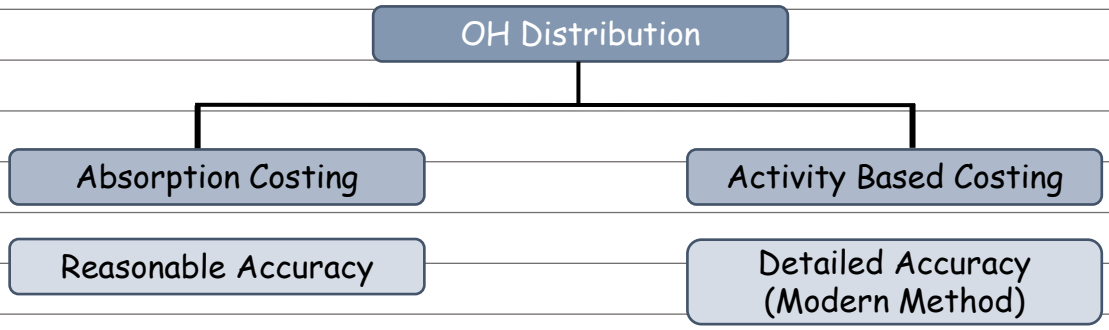
You are required to COMPUTE the pre-determined overhead rate for both the production departments.

Chapter 5

ACTIVITY BASED COSTING

May 18	Nov 18	May 19	Nov 19	Nov 20	Jan 21	Jul 21	Dec 21	May 22
10	15	10	10	10	10	15	10	10

WAYS OF DISTRIBUTION OF OVERHEADS



ABSORPTION OVERHEAD COSTING

- In this method of costing, below are the steps:
  - ❑ Total Factory overheads are first allocated/ apportioned to departments/ cost centers.
  - ❑ OH of Service Cost Centers/ Departments are reapportioned to Production Cost Centers.
  - ❑ Finally, Department wise Absorption rates are derived to absorb overheads to the jobs, units etc. on the basis of direct labour hours, machined hours etc.

- Limitations:
  - ❑ Pooling of cost into functional department is not always logical.
  - ❑ Absorption rates here assume that products that take longer to make, generate more overheads and so on.
  - ❑ This approach do not distribute overheads with detailed accuracy.

ACTIVITY BASED COSTING

- Methodology:
  - ❑ ABC is a technique which involves **identification of cost** with **each cost driving** activity and making it as the **basis for apportionment of costs** over different cost objects/ jobs/ products/ customers or services.

  - ❑ This enables resources & **overhead costs** to be **more accurately** assigned to product services that consume them.

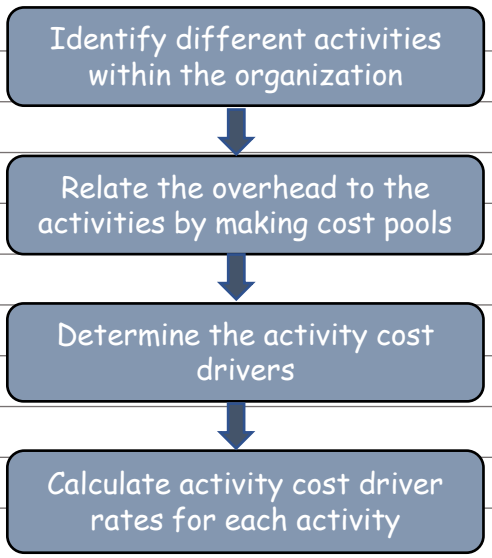
- **Terms:**
  - **Activity**: event that incurs cost .
  - **Cost Object:** Item for which cost measurement is required. Example: product, job, projects, customers, departments etc.
  - **Cost Driver**: Factor that causes change in cost of an activity. Example: no. of inspections, no. of orders, no. of hours spent on project, no. of customer, no. of meetings etc.
  - **Cost Pool**: Group of various cost items that have similar cause and effect relationship with a cost driver. Example: Payroll taxes, fringe benefits, canteen expenses etc. related to a cost driver No. of Employees.

- **Need of ABC:**
  - **Growing Overhead Costs** in the current business scenario due to **high usage of machines.** This requires detailed attention to the overhead costs.
  - **High competition** in the manufacturing industries necessitates more accuracy in costs.
  - Growing **Multi-product** and **Multi Business** Organizations.
  - **Decreasing Costs** of **costing calculations** using IT (cheaper information processing).

- **Advantages of ABC:**
  - More accurate costing of products/services.
  - Overhead allocation is done on logical basis.
  - It enables better pricing policies by supplying accurate cost information.
  - Utilizes unit cost rather than just total cost.
  - Help to identify non-value added activities which facilitates cost reduction.
  - It is very much helpful to organization with multiple products.
  - It highlights problem areas which require attention of the management.

- **Limitations of ABC:**
  - Expensive as compared to traditional
  - Not helpful for small organization, or firm having limited range of products
  - Selection of cost driver may become challenging

STAGES OF ABC



IDENTIFY THE DIFFERENT ACTIVITIES WITHIN THE ORGANISATION

- Practically in a factory, there are many activities (say 200) but to practically use ABC we need to group them into 30-40 major activities
- However in Absorption usually there are very few cost centers (say 5 to 10)
- Hence, the additional number of activities over cost centres means that ABC is more accurate than the traditional method regardless of anything else.
- **Examples** of few activities:
  - -- Assembling
  - -- Inspection
  - -- Supervising
  - -- Machine Set Up
  - -- Ordering

RELATE THE OVERHEADS TO THE ACTIVITIES

- Linking amount of overheads to each activity ;
- Formation of Cost Pools or Cost Buckets ;
- We relate the overheads to any activity by checking causality ;
- Causality: Cause of incurrence of Cost ;
- **Example**: Ordering Cost is caused due to placing of purchase orders hence here ordering cost is overhead cost and placing of orders is an activity to which it is related

DETERMINE THE ACTIVITY COST DRIVERS

- Now we need a number i.e. resource quantity of activity that drives the consumption of

that activity.

- **For Example:** Placing of Orders can be measured by no. of orders placed.

CALCULATE ACTIVITY COST DRIVER RATES FOR EACH ACTIVITY

- It is similar to calculating absorption rate
- We need to calculate cost driver rates for each activity using the below formula
- **Formula:**

$$\text{Activity Cost Driver Rate} = \frac{\text{Total Cost of Activity}}{\text{Activity Driver}}$$

- The activity cost driver rates will be multiplied by the different amounts of each activity that each product/other cost object consumes.
- **Note**: The activity driver rate can be used not only to identify cost of products, as in traditional absorption costing, but it can also be used for costing other cost objects such as customers/customer segments and distribution channels. The possibility of costing objects other than products is part of the benefit of ABC.

- Few Examples :

Activity	Cost Pool	Cost Driver
Ordering and	Ordering and Receiving	Number of purchase orders
Receiving .	Materials cost.	
Setting up of	Setting up related machines	Number of set-ups
Machine.	costs .	
Running of Machine	Machining costs.	Machine hours
Assembling semi-	Assembling costs.	Number of parts
finished goods		
Inspection	Inspecting and testing costs.	Number of tests
Painting	Painting costs.	Number of parts
Supervision	Supervising Costs.	Direct labour hours

- Difference between ABC and Absorption

Basis	ABC (Modern)	Absorption (Traditional)
Related to	Activities	Cost centers / Departments
Accuracy	More Realistic	Less Realistic
Cost drivers	Multiple – Activity wise	Few- Machine hour or Labour hour
		(mainly time is taken as cost driver)
Recovery Rates	Multiple –Activity wise	Either single or two for each
		Department [machine / labour]

Cost assignment to	Cost Objects (includes cost units also) e.g. products, customers, departments, etc.	Cost units e.g. products, jobs, hours
Useful in Cost Control	Unnecessary activities can be eliminated by analyzing each activity in detail.	There is no option of elimination as the costs are at department level.

Que 1 SM Illustration 1 Notebook Page no.

ABC Ltd. is a multiproduct company, manufacturing three products A, B and C. The budgeted costs and production for the year ending 31st March are as follows:

	A	B	C
Production quantity	4,000	3,000	1,600
Resources per unit:			
-Direct Material (kg.)	4	6	3
- Direct Labour (Minutes)	30	45	60

The budgeted direct labour rate was ₹10 per hour, and the budgeted material cost was ` ₹2 per kg. Production overheads were budgeted at ₹99,450 and were absorbed to products using the direct labour hour rate. ABC Ltd. followed the Absorption Costing System.

ABC Ltd. is now considering to adopt an Activity Based Costing system. The following additional information is made available for this purpose.

1. Budgeted overheads were analysed into the following:

	(₹)
Material handling	29,100
Storage Costs	31,200
Electricity	39,150

2. The cost drivers identified were as follows:

Material handling	Weight of material handled
Storage Cost	Number of batches of material
electricity	Number of Machine operations

3. Data on Cost Drivers was as follows:

	A	B	C
For complete production:			
Batches of material	10	5	15
Per unit of production:			
Number of Machine operations	6	3	2

You are requested to:

1. PREPARE a statement for management showing the unit costs and total costs of each product using the absorption costing method.
2. PREPARE a statement for management showing the product costs of each product using the ABC approach.
3. STATE what are the reasons for the different product costs under the two approaches?

Que 2 SM Illustration 3 Notebook Page no,

ABC Ltd. Manufactures two types of machinery equipment Y and Z and applies/absorbs overheads on the basis of direct-labour hours. The budgeted overheads and direct-labour hours for the month of December are ₹ 12,42,500 and 20,000 hours respectively.

The information about Company's products is as follows:

	Equipment	
	Y	Z
Budgeted Production Volume	2,500 units	3,125 units
Direct material Cost	₹300 per unit	₹450 per unit
Direct Labour Cost		
Y : 3 hours @ ₹ 150 per hour		
Z : 4 hours @ ₹ 150 per hour	₹450	₹600

ABC Ltd.'s overheads of ₹12,42,500 can be identified with three major activities: Order Processing (₹ 2,10,000), machine processing (₹8,75,000), and product inspection (₹ 1,57,500). These activities are driven by number of orders processed, machine hours worked, and inspection hours, respectively. The data relevant to these activities is as follows:

	Orders processed	Machine hours worked	Inspection Hours
Y	350	23,000	4,000
Z	250	27,000	11,000
Total	600	50,000	15,000

Required:

(i) Assuming use of direct-labour hours to absorb/apply overheads to production, COMPUTE the unit manufacturing cost of the equipment Y and Z, if the budgeted manufacturing volume is attained.

(ii) Assuming use of activity-based costing, COMPUTE the unit manufacturing costs of the equipment Y and Z, if the budgeted manufacturing volume is achieved.

(iii) ABC Ltd.'s selling prices are based heavily on cost. By using direct-labour hours as an application base, CALCULATE the amount of cost distortion (under-costed or over-costed) for each equipment.

Que 3 SM Exercise Que 3 Notebook Page no.

Family Store wants information about the profitability of individual product lines: Soft drinks, Fresh produce and Packaged food. Family store provides the following data for the current year for each product line:

	Soft drinks	Fresh produce	Packaged food
Revenues	₹39,67,500	₹1,05,03,000	₹60,49,500
Cost of gooods sold	₹30,00,000	₹75,00,000	₹45,00,000
Cost of bottles returned	₹60,000	-	-
Number of purchase orders placed	360	840	360
Number of deliveries received	300	2,190	660
Hours of shelf-stocking items	540	5,400	2,700
Items sold	₹1,26,000	₹11,04,000	₹3,06,000

Family store also provides the following information for the current year:

Actiivty	Description of activity	Total Cost	Cost-allocation base
Bottles Returns	Returning of empty bottles	₹ 60,000	Direct tracing to soft Drink line
Ordering	Placing of orders for purchases	₹7,80,000	1,560 purchase orders
Deliveery	Physical delivery and receipt of goods.	₹12,60,000	3,150 deliveries
Shelf Stocking	Stocking of goods on store shelves and on-going restocking	₹8,64,000	8,640 hours of shelf-Stocking time

Customer Support	Assistance provided to customers including check-out	₹15,36,000	15,36,000 items sold

Required:

(i) Family store currently allocates support cost (all cost other than cost of goods sold) to product lines on the basis of cost of goods sold of each product line. CALCULATE the operating income and operating income as a % of revenues for each product line.

(ii) If Family Store allocates support costs (all costs other than cost of goods sold) to product lines using and activity-based costing system, CALCULATE the operating income and operating income as a % of revenues for each product line.

Que 4 SM Illustration 1 Notebook Page no.

MST Limited has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity.

Activity	Cost driver	Capacity	Cost
Power	Kilowatt hours	50,000 kilowatt hrs	₹2,00,000
Quality Inspection	Number of Inspections	10,000 inspections	₹3,00,000

The company makes three products M, S and T. For the year ended March 31st, the following consumption of cost drivers was reported:

Product	Kilowatt hours	Quality Inspection
M	10,000	3,500
S	20,000	2,500
T	15,000	3,000

Required:

(i) COMPUTE the costs allocated to each product from each activity.

(ii) CALCULATE the cost of unused capacity for each activity.

(iii) DISCUSS the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate.

Que 5 SM Illustration 4 Notebook Page no.

Humara - Apna' bank offers three products, viz., deposits, Loans and Credit Cards. The bank has selected 4 activities for a detailed budgeting exercise, following activity based costing methods.

The bank wants to know the product wise total cost per unit for the selected activities, so that prices may be fixed accordingly.

The following information is made available to formulate the budget

Activity	Present Cost	Estimation for the budget period
Atm Services		
(a) Machine Maintenance	4,00,000	All fixed, no charge
(b) Rents	2,00,000	Fully fixed, no charge
(c) Currency Replenishment cost	1,00,000	Expected to double during budget period.
	7,00,000	(this activity is driven by no. of ATM transaction)
Computer Processing	5,00,000	Half this amount is fixed and no change is expected. The variable portion is expected to increase to three times the current level. (This activity is driven by the number of computer transactions)
Issuing Statements	18,00,000	Presently, 3 lakh statements are made. In the budget period, 5 lakh statements are expected. For every increase of one lakh statement, one lakh rupees is the budgeted increase. (This activity is driven by the number of statements)
Computer Inquiries	2,00,000	Estimated to increase by 80% during the budget period. (This activity is driven by telephone minutes)

The activity drivers and their budgeted quantifies are given below:

Activity Drivers	Deposit	Loans	Credit cards
No. of ATM transactions	1,50,000	--	50,000
No. of Computer Processing Transactions	15,00,000	2,00,000	3,00,000
No. of Statements to be issued	3,50,000	50,000	1,00,000
Telephone minutes	3,60,000	1,80,000	1,80,000

The bank budgets a volume of 58,600 deposit accounts, 13,000 loan accounts, and 14,000 Credit Card Accounts.

Required :

(i) CALCULATE the budgeted rate for each activity.

(ii) PREPARE the budgeted cost statement activity wise.

(iii) COMPUTE the budgeted product cost per account for each product using (i) and (ii) above.

Que 6 SM Exercise Que 1 Notebook Page no.

Woolmark Ltd. manufactures three types of products namely P, Q and R. The data relating to a period are as under:

Particular	P	Q	R
Machine hours per unit	10	18	14
Direct labour hours per unit	4	12	8
Direct Material per unit (₹)	90	80	120
Production (units)	3,000	5,000	20,000

Currently the company uses traditional costing method and absorbs all production overheads on the basis of machine hours. The machine hour rate of overheads is ₹ 6 per hour. Direct labour hour rate is ₹ 20 per hour.

The company proposes to use activity based costing system and the activity analysis is as under:

Particular	P	Q	R
Batch size (units)	150	500	1,000
Number of purchase orders per batch	3	10	8
Number of inspection per batch	5	4	3

The total production overheads are analyzed as under:	
Machine set up costs	20%
Machine operation costs	30%
Inspection costs	40%
Material procurement related costs	10%

Required

(i) CALCULATE the cost per unit of each product using traditional method of absorbing all production overheads on the basis of machine hours.

(ii) CALCULATE the cost per unit of each product using activity based costing principles.

Que 7 SM Exercise Que 2 Notebook Page no.

RST Limited specializes in the distribution of pharmaceutical products. It buys from the pharmaceutical companies and resells to each of the three different markets.

(i) General Supermarket Chains.

(ii) Drugstore Chains.

(iii) Chemist Shops.

The following data for the month of April in respect of RST Limited has been reported

	General Supermarket	Drugstore Chains	Chemist shops
Average revenue per delivery	84,975	28,875	5,445
Average cost of goods sold per Delivery	82,500	27,500	4,950
Number of deliveries	330	825	2,750

In the past, RST Limited has used gross margin percentage to evaluate the relative profitability of its distribution channels.

The company plans to use activity –based costing for analysing the profitability of its distribution channels.

The Activity analysis of RST Limited is as under:

Activity area	Cost Driver
Customer purchase order processing	Purchase orders by customers
Line-item ordering	Line-items per purchase order

Store delivery	Store deliveries
Cartoon dispatched to stores	Cartoon dispatched to a store per delivery
Shelf- Stocking of customer store	Hours of shelf stocking

The April month's operating costs (other than cost of goods sold) of RST Limited are ₹ 8,27,970. These operating costs are assigned to five activity areas. The cost in each area and the quantity of the cost allocation basis used in that area for the month of April are as follows:

Activity Area	Total Cost (₹)	Total units of cost Allocation base
Customer purchase order processing	2,20,000	5,500 order
Line item ordering	1,75,560	58,520 line items
Store delivery	1,95,250	3,905 store deliveries
Cartoons dispatched to store	2,09,000	2,09,000 cartoons
Shelf Stocking at customer store	28.160	1,760 hours

Other data for the month of April include the following:

	General Supermarket chains	Drugstore chains	Chemist shops
Total number of orders	385	990	4,125
Average number of line items per order	14	12	10
Total number of store deliveries	330	825	2,750
Average number of cartoons shipped per store delivery	300	80	16
Average number of hours of shelf-Stocking per store delivery	3	0.6	0.1

Required:

(i) COMPUTE gross-margin percentage for each of its three distribution channels and compute RST Limited's operating income.

(ii) COMPUTE the rate per unit of the cost-allocation base for each of the five activity areas.

(iii) COMPUTE the operating income of each distribution channel using the activity-based costing information. Comment on the results. What new insights are

available with the activity-based cost information?

(iv) DESCRIBE four challenges one would face in assigning the total operating costs of ₹ 8,27,970 to five activity areas.

Que 8 | SM Exercise Que 4 | Notebook Page no.

Alpha Limited has decided to analyse the profitability of its five new customers. It buys bottled water at ₹90 per case and sells to retail customers at a list price of ` 108 per case. The data pertaining to five customers are:

	Customer				
	A	B	C	D	E
Cases sold	4,680	19,688	1,36,800	71,550	8,775
Listed selling price	₹108	₹108	₹108	₹108	₹108
Actual selling price	₹108	₹106.20	₹99	₹104.40	₹97.20
Number of purchase order	15	25	30	25	30
Number of customer order	2	3	6	2	3
Number of deliveries	10	30	60	40	20
Km. travelled per delivery	20	6	5	10	30
No. of expedited deliveries	0	0	0	0	1

Its five activities and their cost drivers are:

Activity	Cost driver Rate
Order taking	₹ 750 per purchase order
Customer visits	₹600 per customer visit
Deliveries	₹ 5.75 per delivery km travelled
Product handling	₹ 3.75 per case sold
Expedited deliveries	₹ 2,250 per expedited delivery

Required:

(i) COMPUTE the customer-level operating income of each of five retail customers now being examined (A, B, C, D and E). Comment on the results.

(ii) STATE what insights are gained by reporting both the list selling price and the actual selling price for each customer?

Que 9 | SM Exercise Que 5 | Notebook Page no.

BABYSOFT is a global brand created by Bio-organic Ltd. The company manufactures three ranges of beauty soaps i.e. BABYSOFT- Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond. The budgeted costs and production for the month of December are as follows

		BABYSOFT- Gold		BABYSOFT-pearl		BABYSOFT- Diamond	
Prdouction of soaps (units)		4,000		3,000		2,000	
Resources per unit		Qty	Rate	QTY	Rate	Qty	Rate
--	Essential oils	60 ml	₹200/100ml	55ml	₹300/100ml	65ml	₹300/100ml
--	Cocoa Butter	20g	₹200/100g	20g	₹200.100g	20g	₹200/100g
--	Filtered water	30ml	₹15/100ml	30ml	₹15/100ml	30ml	₹15/100ml
--	Chemicals	10g	₹30/100g	12g	₹50/100g	15g	₹60/100g
--	Direct labour	30 min.	₹10/hrs.	40min	₹ 10 /hrs.	60 min.	₹10/hrs

Bio-organic Ltd. followed an Absorption Costing System and absorbed its production overheads, to its products using direct labour hour rate, which were budgeted at ₹1,98,000.

Now, Bio-organic Ltd. is considering adopting an Activity Based Costing system. For this, additional information regarding budgeted overheads and their cost drivers is provided below:

Particlar	(₹)	Cost driver
Forklifting cost	58.000	Weight of material lifted
Supervising cost	60,000	Direct labour hours
utilities	80,000	Number of machine operations

The number of machine operations per unit of production are 5, 5, and 6 for BABYSOFT-Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond respectively.

(Consider (i) Mass of 1 litre of Essential Oils and Filtered Water equivalent to 0.8 kg and 1 kg respectively (ii) Mass of output produced is equivalent to the mass of input materials taken together.)

You are requested to:

(i) PREPARE a statement showing the unit costs and total costs of each product using the absorption costing method.

(ii) PREPARE a statement showing the product costs of each product using the ABC approach.

(iii) STATE what are the reasons for the different product costs under the two approaches?

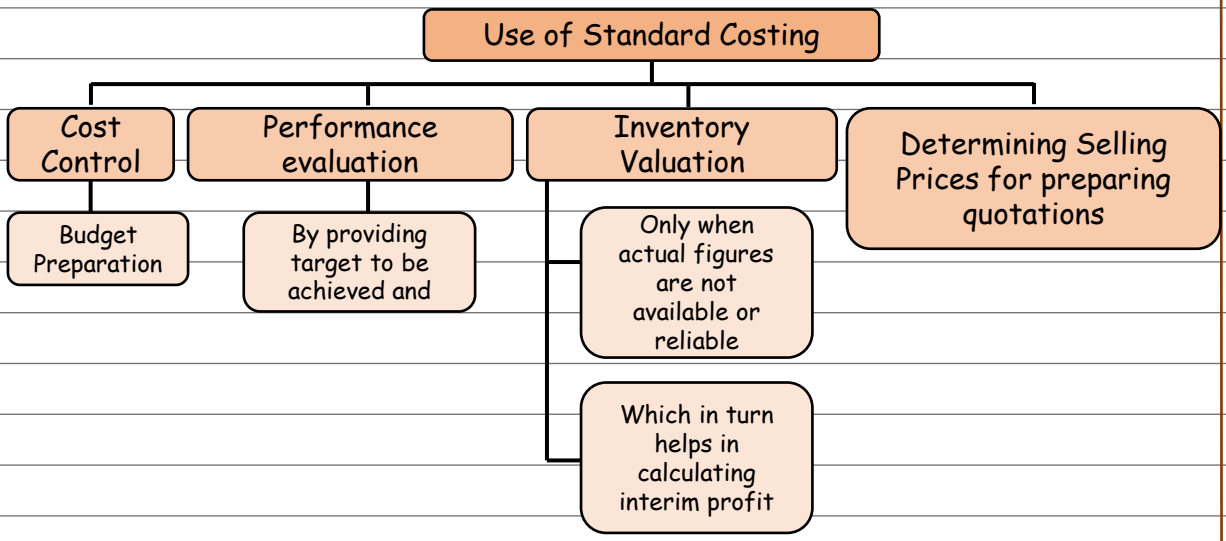
Chapter 13

STANDARD COSTING

May 18	Nov 18	May19	Nov19	Nov20	Jan21	Jul21	Dec21	May 22
5	5	10	10	10	10	10	15	10

STANDARD COSTING

- Cost control is one of the objectives of cost management.
- Management of an organization setups predetermined cost to compare the actual cost with the predetermined cost.
- Predetermined costs are standard costs used for cost control and performance evaluation. (of a responsibility centre)
- Standard costing is a method of cost and management accounting which starts with setting of standards and ends with reporting of variances to management for taking corrective actions.
- The Official Terminology of CIMA, London defines standard costing as "Control technique that reports variances by comparing actual costs to pre-set standards so facilitating action through management by exception."

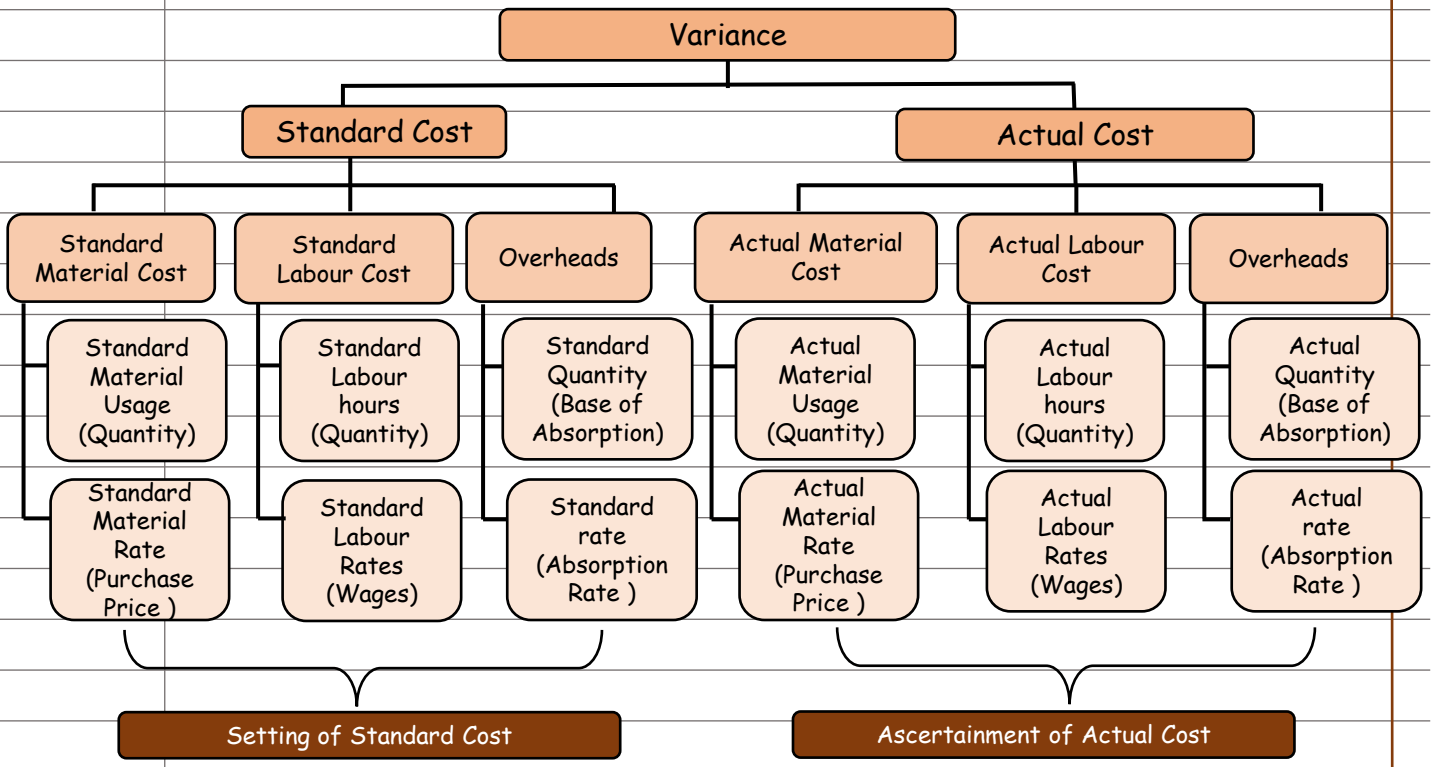


TERMS

- Standard Cost:
  - ❑ Standard cost is defined in the CIMA Official Terminology as "'the planned unit cos of the product, component or service produced in a period.
  - ❑ The standard cost may be determined on a number of bases.

PROCESS OF STANDARD COSTING

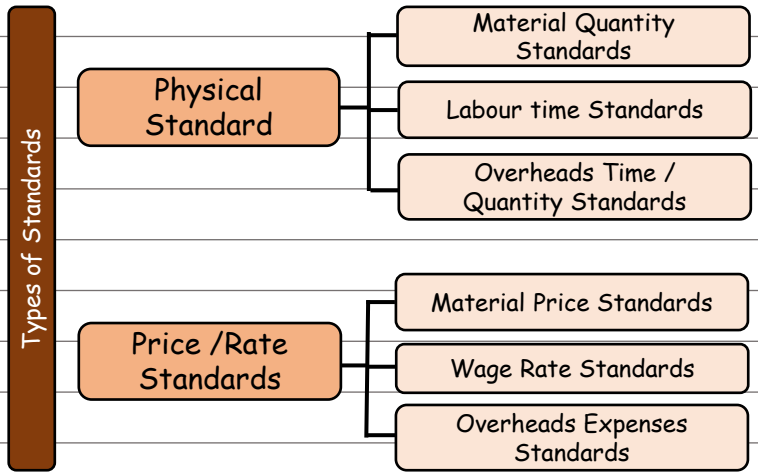
1. Setting of Standards.
2. Ascertainment of Actual Costs.
3. Comparison of actual cost with standard cost.
4. Investigate the reason of variance.
5. Disposition of Variances (accounting treatment)



Standard Cost will be calculated as

Standard Quantity x Standard Rate = Standard Cost

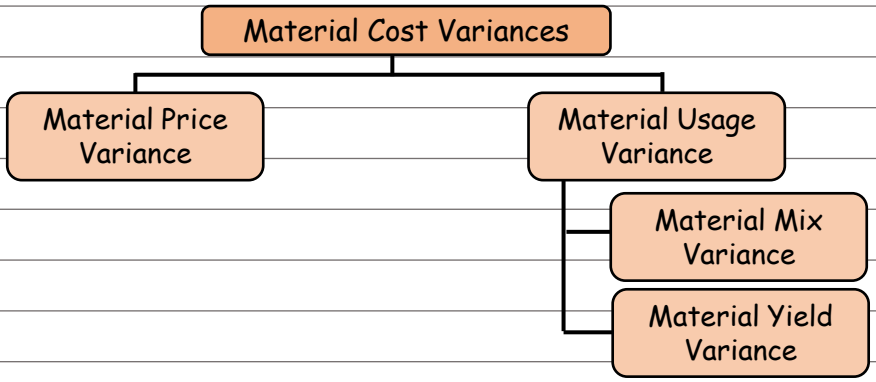
Types of Standards



TYPES OF VARIANCES

- Favorable Variances:
  - ❑ Favorable variances are those which are profitable for the company. (lower cost than standard, higher sales than standard)
- Adverse Variances:
  - ❑ Adverse variances are those which cause loss to the company. (higher the cost than standard, lower the sales than standard)

MATERIAL COST VARIANCES



MATERIAL VARIANCES

Variance	Formula	Explanation	Reason/Responsibility
Material Cost Variance	(SQ x SP) – (AQ x AP)	The difference between the Standard Material Cost of the actual production volume and the Actual Cost of Material	**Reasons**: Either due to variance in consumption or variance in prices
Material Price Variance	AQ x (SP - AP)	The difference between the Standard Price and Actual Price for the Actual Quantity **Purchased***	**Responsibility**: Purchase Dept. [*material consumed can also be used if material purchased is not given]
Material Usage Variance	SP x (SQ - AQ)	The difference between the Standard Quantity specified for actual production and	**Responsibility**: Production Dept. Reasons: difference in proportion or yield.

		the Actual Quantity used, at Standard Price.	Standard Price is used in formula as we want to calculate impact of quantity only.
Material Mix Variance	SP x (RSQ - AQ)	The difference between the Actual Quantity in standard proportion and Actual Quantity in actual proportion, at Standard Price.	It arises only when the two or more material inputs are used for production.
Material Yield Variance (Material Sub-usage Variance)	SP x (SQ - RSQ)	The difference between the Standard Quantity specified for actual production and Actual Quantity in standard proportion, at Standard Purchase Price.	It may arise due to use of sub- standard quality of materials, inefficiency of workers or due to wrong processing.

Terms	Meaning
SQ : Standard Quantity	Quantity of inputs that should be used to produce actual output.
AQ: Actual Quantity	Quantity of inputs actually used to produce actual output.
RSQ: Revised Standard Quantity	If Actual total quantity of inputs were used in standard proportion
SP: Standard Price	Pre-determined price set for materials to be purchased
AP: Actual Price	Actual Price at which materials are purchased

Note: Since Purchase Department is responsible for Material Price Variance, it is ideal to use Actual Quantity Purchased for the formula. If we use purchase quantity the MPV + MUV will not match with MCV but that is ok.

Que 1 SM Illustration 1 Notebook Page no.

The standard and actual figures of product 'Z' are as under:

		Standard	Actual
	Material quantity	50 units	45 units
	Material price p.u.	₹ 1.00	₹0.80 .

CALCULATE material cost variances.

Que 2 SM Illustration 2 — Notebook Page no.

NXE Manufacturing Concern furnishes the following information:

Standard:	Material for 70 kg finished products	100 kg
	Price of material	₹ 1 per kg
Actual:	Output	2,10,000 kg
	Material used	2,80,000 kg
	Cost of Materials	₹ 2,52,000

CALCULATE: (a) Material usage variance, (b) Material price variance, (c) Material cost variance.

Que 3 SM Exercise Que 1 — Notebook Page no.

For making 10 kg. of CEMCO, the standard material requirements is:

Material	Quantity	Rate per kg. (₹)
A	8 kg	6.00
B	4 kg	4.00

During April, 1,000 kg of CEMCO were produced. The actual consumption of materials is as under:

Material	Quantity	Rate per kg. (₹)
A	750	7.00
B	500	5.00

CALCULATE (a) Material Cost Variance; (b) Material Price Variance; (c) Material usage Variance.

Que 4 SM Exercise Que 2 — Notebook Page no.

The standard mix to produce one unit of a product is as follows:

Material X	60 units @ ₹15 per unit	=	900
Material Y	80 units @ ₹ 20 per unit	=	1,600
Material Z	100 units @ ₹ 25 per unit	=	2,500
	240 units		5,000

During the month of April, 10 units consumption were actually produced and consumption

Was as follows:

Material X	640 units @ ₹ 17.50 per unit	=	11,200
Material Y	950 units @ ₹ 18.00 per unit	=	17,100
Material Z	870 units @ ₹ 27.50 per unit	=	23,925
	2,460 units		52,225

CALCULATE all material variances.

Que 5 SM Illustration 3 Notebook Page no.

The standard cost of a chemical mixture is as follows:

40% material A at ₹ 20 per kg ;

60% material B at ₹ 30 per kg

A standard loss of 10% of input is expected in production. The cost records for a period showed the following usage:

90 kg material A at a cost of ₹18 per kg ;

110 kg material B at a cost of ₹ 34 per kg ;

The quantity produced was 182 kg of good product.

CALCULATE (a) Material cost variance, (b) Material price variance, (c) Material usage variance.

Que 6 SM Exercise Que 14 Notebook Page no.

J.K. Ltd. manufactures NXE by mixing three raw materials. For every batch of 100 kg. of NXE, 125 kg. of raw materials are used. In the month of April, 60 batches were prepared to produce an output of 5,600 kg. of NXE.

The standard and actual particulars for the month of April, are as follows:

Raw Material	Standard		Actual		Quantity of Raw Materail purchased
	Mix	Price per kg.	Mix	Price per kg.	
	(%)	(₹)	(%)	(₹)	(kg.)
A	50	20	60	21	5,000
B	30	10	20	8	2,000
C	20	5	20	6	1.200

You are required to CALCULATE:

(i) Material Price variance

(ii) Material Usage Variance

Que 7 SM Illustration 4 Notebook Page no.

ABC Ltd. produces an article by lending two basic raw materials. It operates a standard costing system and the following standards have been set for raw materials:

Material	Standard Mix	Standard price (₹ per kg.)
A	40%	4
B	60%	3

The standard loss in processing is 15%. During April 2021, the company produced 1,700 kgs. of finished output.

The position of stock and purchases for the month of April 2021 are as under:

Material	Stock on 01-04-2021	Stock on 30-04-2021	Purchased during April 2021	
	(kg.)	(kg.)	(Kg.)	(₹)
A	35	5	800	3,400
B	40	50	1,200	3,000

Opening stock of material is valued at standard price.

CALCULATE the following variances:

(i) Material price variance

(ii) Material usage variance

(iii) Material yield variance

(iv) Material mix variance

(v) Total Material cost variance

Que 8 SM Exercise Que 3 Notebook Page no.

GAP Limited operates a system of standard costing in respect of one of its products which is manufactured within a single cost centre. Following are the details.

Budgeted data:

Material	**Qty**	**Price (₹)**	**Amount (₹)**
A	60	20	1200
B	40	30	1200
Inputs	100		2400
Normal loss	20		
Output	80		2400

Actual Data:

Actual output 80 units.

Material	Qty	Price (₹)	Amount (₹)
A	70	?	?
B	?	30	?

Material Price Variance (A) ₹105A

Material cost variance ₹ 275A

You are required to CALCULATE:

(i) Actual Price of material A

(ii) Actual Quantity of material B

(iii) Material Price Variance

(iv) Material Usage Variance

(v) Material Mix Variance

(vi) Material Sub Usage Variance

Que 9 SM Exercise Que 15 Notebook Page no.

Following data is extracted from the books of XYZ Ltd. for the month of January

(i) Estimation:

Particulars	Qty (kgs.)	Price (₹)	Amt. (₹)
Material A	800	?	-
Material B	600	30.00	18,000
			--

(ii) Actuals:-

1480 kg of output produced.

Particulars	Qty (kgs.)	Price (₹)	Amt. (₹)
Material A	900	?	--
Material B	?	32.50	--
			59,825

(iii) **Other Information-**

Material Cost Variance = ₹ 3,625 (F)

Material Price Variance = ₹ 175 (F)

You are required to CALCULATE:

(i) Standard Price of Material-A;

(ii) Actual Quantity of Material-B;

(iii) Actual Price of Material-A;

(iv) Revised standard quantity of Material-A and Material-B; and

(v) Material Mix Variance

Que 10 | SM Exercise que 4 | Notebook Page no.

One kilogram of product K requires two chemicals A and B. The following were the details of product K for the month of June 2021:

(a) Standard mix for chemical A is 50% and chemical B is 50%.

(b) Standard price kilogram of chemical A is ₹ 12 and chemical B is ₹15.

(c) Actual input of chemical B is 70 kilograms.

(d) Actual price per kilogram of chemical A is ₹ 15

(e) Standard normal loss is 10% of total input.

(f) Total Material cost variance is ₹650 adverse.

(g) Total Material yield variance is ₹135 adverse

You are required to CALCULATE:

(i) Total Material mix variance

(ii) Total Material usage variance

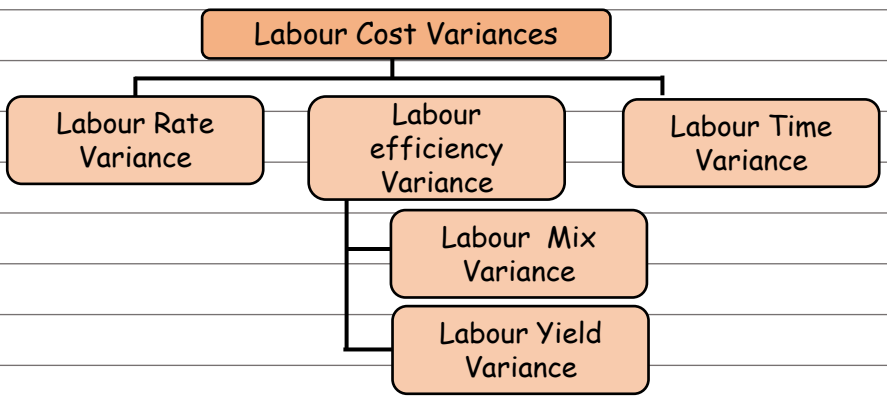
(iii) Total Material price variance

(iv) Actual loss of actual input

(v) Actual input of chemical A

(vi) Actual price per kg. of chemical B

LABOUR COST VARIANCES



Variance	Formula	Explanation	Reason /Responsibility
Labour Cost Variance	(SH x SR) - (Ah_{paid} x AR)	The difference between the Standard	Reasons: Either due to variance in rates or

		Labour Cost of the actual production volume and the Actual Cost of Labour	efficiency .
Labour Rate Variance	AH_{paid} × (SR – AR)	The difference between the Standard Rate per hour and Actual Rate per hour for the Actual Hours paid.	Responsibility: Mostly out of control, however personnel manager is responsible for labour rate negotiation.
Labour Efficiency Variance	SR × (SH – AH_{worked})	The difference between the Standard Hours specified for actual production and Actual Hours worked at Standard Rate.	Reasons: change in mix, productivity of workers Responsibility: production manager or foreman can be held responsible for the adverse variance which can be controlled.
Labour Idle Time Variance	SR × (AH_{paid} – AH_{worked})	The difference between the Actual Hours paid and Actual Hours worked at Standard Rate.	It is difference between paid and worked hours

Terms	Meaning
AH_{paid}	Actual hours for which payment is done .
AH_{worked}	Actual hours spent in job or production.
SR: Standard Rate	Pre-determined wage rate decided while setting standards.
AR: Actual rate	Actual rate based on which payment is made to worker.
SH: Standard Hours	Hours that should be spent for a particular unit or job.
RSH: Revised Standard Hours	Actual hours taken in standard proportion of skills of Workers.

Que 11 SM Illustration 5 Notebook Page no.

The standard and actual figures of a firm are as under

Standard time for the job 1,000 hours

	Standard rate per hour	₹ 50
	Actual time taken	900 hours
	Actual wages paid	₹ 36,000
	CALCULATE variances.	

Que 12 SM Illustration 6 Notebook Page no.

The standard output of product 'EXE' is 25 units per hour in manufacturing department of a company employing 100 workers. The standard wage rate per labour hour is ₹ 6.

In a 42 hours week, the department produced 1,040 units of 'EXE' despite 5% of the time paid being lost due to an abnormal reason. The hourly wages actually paid were ₹ 6.20, ₹ 6 and ₹5.70 respectively to 10, 30 and 60 of the workers.

CALCULATE relevant labour variances.

Que 13 SM Illustration 7 Notebook page no.

NPX Ltd. uses standard costing system for manufacturing of its product X. Following is the budget data given in relation to labour hours for manufacture of 1 unit of Product X :

Labour	Hours	Rate (₹)
Skilled	2	6
Semi-Skilled	3	4
Un-Skilled	5	3

In the month of January, total 10,000 units were produced following are the details

Labour	Hours	Rate (₹)	Amount (₹)
Skilled	18,000	7	1,26,000
Semi-Skilled	33,000	3.5	1,15,500
Un-skilled	58,000	4	2,32,000
Total	1,09,000		4,73,000

Actual Idle hours (abnormal) during the month:

Skilled:	500
Semi- Skilled	700
Unskilled:	800
Total	2,000

CALCULATE:

(a) Labour Variances.

(b) Also show the effect on Labour Rate Variance if 5,000 hours of Skilled Labour are paid @ ₹ 5.5 per hour and balance were paid @ ₹ 7 per hour.

Que 14 | SM Illustration 8 | Notebook Page no.

The standard labour employment and the actual labour engaged in a week for a job are as under:

	Skilled worker	Semi-Skilled worker	Unskilled worker
Standard no. of workers in the gang	32	12	6
Actual no. of workers employed	28	18	4
Standard wage rate per hour	3	2	1
Actual wage rate per hour	4	3	2

During the 40 hours working week, the gang may produce 1,800 labour hours of work.

CALCULATE:

(a) Labour Cost Variance (b) Labour Rate Variance

(c) Labour Efficiency Variance (d) Labour Mix Variance

(e) Labour Yield Variance

Que 15 | SM Exercise Que 5 | Notebook Page no.

The following standards have been set to manufacture a product:

Direct Material:	(₹)
2 units of A @ ₹ 4 per unit	8.00
3 units of B @ ₹3 per unit	9.00
15 units of C @ ₹ 1 per unit	15.00
Direct Labour: 3 hours @ ₹ 8 per hour	24.00
Total standard prime cost	**56.00**

The company manufactured and sold 6,000 units of the product during the year. Direct material costs were as follows:

12,500 units of A at ₹ 4.40 per unit;

18,000 units of B at ₹ 2.80 per unit;

88,500 units of C at ₹1.20 per unit ;

The company worked 17,500 direct labour hours during the year. For 2,500 of these hours, the company paid at ₹12 per hour while for the remaining, the wages were paid at . standard rate.

CALCULATE:

(i) Materials price variance & Usage variance

(ii) Labour rate & Efficiency variances

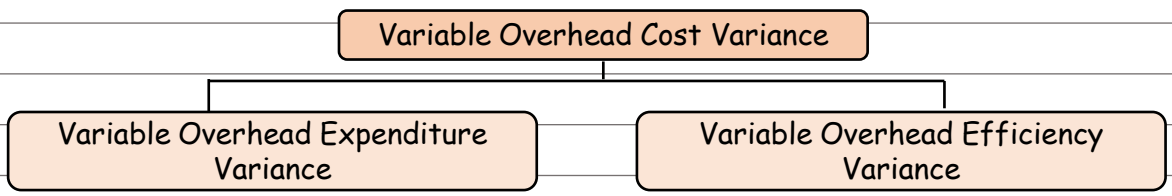
Que 16

The following information is available from the cost records of Novell & Co. for the month of March 2021:

Material purchased	20,000 units @₹88,000
Material consumed	19,000 units
Actual wages paid for 4,950 hrs.	₹24,750
Units produced	1,800 units
Standard rates and pieces are:	
Direct material	₹ 4 per unit
Standard output	10 number for one unit
Direct labour rate	₹4 per hour
Standard Requirement	2.5 hours per unit

You are required to CALCULATE relevant material and labour variance for the month.

VARIABLE OVERHEAD COST VARIANCES



VARIABLE OVERHEAD VARIANCES

Variance	Formula	Explanation	Reason/Responsibility
Variable Overhead Cost Variance	Recovered Overhead – Actual Overhead (SH×SR – AH×AR)	Difference between Variable Overhead charged/ recovered/ absorbed on the basis of standard hours for actual output and actual overheads expenses incurred,.	**Reasons:** due to extra expenditure due to extra hours spent on output (efficiency).

Variable Overhead Efficiency Variance	Recovered Overhead – Standard Overhead (SH-AH)×SR	If work is done inefficiently, then actual output is lower which results in lower recovered overheads than what it should be. This variance shows this difference.	Responsibility: This is similar to labor efficiency variance. Efficiency of labor will have one impact in labor cost and one in Overhead if overheads are dependent on labor.
Variable Overhead Expenditure Variance	Standard Overhead – Actual Overhead (SR-AR)×AH	This variance is showing the extra expenditure done. No impact of efficiency is taken here. It's a kind of rate variance.	Responsibility: Purchase Departments or user department (factory, admin, S&D) if they are directly procuring product or services,

VOH Variance Terms

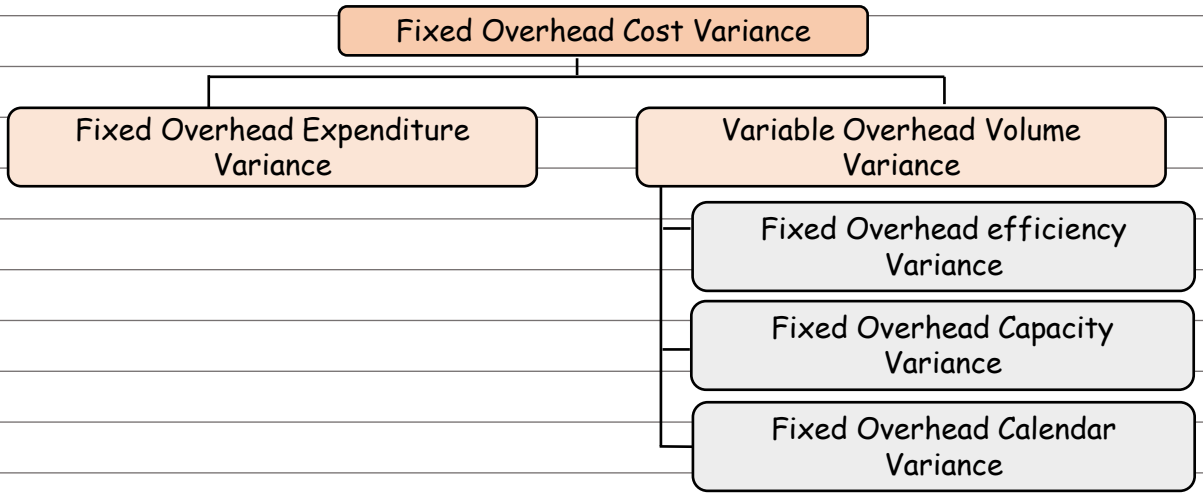
- **Recovered Overheads:** [SH x SR]
  - Standard Hours for actual output × Recovery Rate [because variable overheads will be charged on the basis of actual output and not on actual hours]
- **Standard Overheads:** [AH x SR]
  - Overheads that should be incurred considering actual hours on planned efficiency i.e. Actual hours × Recovery Rate per hour
- **Actual Overheads**: [AH x AR]
  - The actual overhead expenditure incurred (of variable nature)

Que 17 SM Illustration 9 Notebook Page no.

From the following information of G Ltd., CALCULATE (i) Variable Overhead Cost Variance; (ii) Variable Overhead Expenditure Variance and (iii) Variable Overhead Efficiency Variance:

Budgeted production	6,000 units
Budgeted variable overhead	₹ 1,20,000
Standard time for one unit of output	2 hours
Actual production	5,900 units
Actual overhead incurred	₹ 1,22,000
Actual hours worked	11,600 hours

FIXED OVERHEAD COST VARIANCES



Special points on FOH variance

- All other variances are based on variable cost – Material, Labour, Variable Overheads Variances ;
- Fixed Overheads variances being overhead on a fixed cost has below special considerations:
  - ❑ Change in cost due to change in production output is not considered as variance in case of material, labour, variable overhead. However, in case of FOH variance it will be treated as variance.
  - ❑ There is no use of initial budget in case of other variances as those cost do change with change in output and we need to adjust our budget according to actual production but the case with FOH is different.

Fixed Overhead Variances

Variance	Formula	Explanation	Reason/Responsibility
Fixed Overhead Cost Variance	Recovered Overhead – Actual Overhead	Difference between Fixed Overhead charged/ recovered/ absorbed on the basis of standard hours for actual output and actual overheads expenses incurred.	Reasons: - due to extra expenditure - due to output / production volume
Fixed Overhead Expenditure Variance	Budgeted Overhead –	This variance is showing the extra expenditure	Responsibility: Purchase Departments or user

Expenditure Variance	Actual Overhead	done. No impact of production volume is taken here.	department (factory, admin, S&D) if they are directly procuring product or services.
Fixed Overhead Volume Variance	Recovered Overhead – Budgeted Overhead (SH -BH) x SR	If the output/ volume of production is lower or higher than budgeted, there will be Under recovery and Over Recovery respectively. This variance shows the same. This variance is also called as Production volume variance.	Reasons: The main factor here is higher or lower production i.e. difference in production than estimated (budgeted). It can be caused due to - Less no. of working hours available in the factory (capacity) - Efficiency of workers Less no. of days worked in factory (calendar)
Fixed Overhead Capacity Variance	(AH- RBH) × Hourly Overhead Rate RBH: Revised Budgeted Hours as per actual working days.	This overheads gives us the view on how much less production is done in the factory on account of less no. of working hours (don't confuse with efficiency) [here we will consider only actual working days]	Responsibility: This is generally due to idle time or non-availability of RM, etc.
Fixed Overhead Efficiency Variance	(SH-AH)×Hourly Overhead Rate SH: Standard Hours for actual output	If work is done in-efficiently, then actual output is lower which results in lower recovered overheads than what it should be. This variance shows this difference.	Responsibility: This is similar to labor efficiency variance. Efficiency of labor will have one impact in labor cost and one in Overhead if overheads are dependent on labor.
Fixed Overhead Calendar Variance	(RBH – BH) × Hourly Overhead Rate.	This gives view on how much production is lost due to unexpected holidays and other non-working days	Out of control Usually

FOH VARIANCE VARIOUS TERMS

- Recovered Overheads:
  - ❑ Standard Hours for actual output × Recovery Rate [because fixed overheads will be charged on the basis of actual output and not on actual hours]
- Actual Overheads:
  - ❑ The actual overhead expenditure incurred (of variable nature)
- Budgeted Overhead:
  - ❑ Overheads budgeted considering budgeted volume (starting point)

Example 1

Particular	Budget	Actual
Direct labour hours	12,000	11,136
Production Output	6,000 units	5900 units
Fixed overheads	Rs. 7,20,000	Rs. 7,30,000

Example 2

Particular	Budget	Actual
Working days in a worker	25 days	24 days
No. of worker	60	58
Working hours per day	8	8
Production output	6,000 units	5,900 units
Fixed overheads	Rs.7,20,000	Rs.7,30,000

Que 18 SM Illustration 10 Notebook Page no.

The cost detail of J&G Ltd. for the month of September is as follows:

	Budgeted	Actual
Fixed Overhead	₹15,00,000	₹ 15,60,000
Units of production	7,500	7,800
Standard time for one unit	2 hours	-
Actual hours worled	-	16,000 hours

Required:

CALCULATE (i) Fixed Overhead Cost Variance (ii) Fixed Overhead Expenditure Variance (iii) Fixed Overhead Volume Variance (iv) Fixed Overhead Efficiency Variance and (v) Fixed Overhead Capacity Variance.

Que 19 SM Illustration 11 Notebook Page no.

A company has a normal capacity of 120 machines, working 8 hours per day of 25 days in a

month. The fixed overheads are budgeted at ₹ 1,44,000 per month. The standard time required to manufacture one unit of product is 4 hours.

In April 2021, the company worked 24 days of 840 machine hours per day and produced 5,305 units of output. The actual fixed overheads were ₹1,42,000.

COMPUTE the following Fixed Overhead variance:

1. Efficiency variance
2. Capacity variance
3. Calendar variance
4. Expenditure variance
5. Volume variance
6. Total Fixed overhead variance

FOH VOLUME VARIANCE (ALTERNATIVE APPROACH)

Based on hours :

(SH – BH) x SR per hour

SH is planned hours on actual output

BH is planned hours on budgeted output

Based on output :

(Actual Output – Budgeted Output) x SR per unit

Que 20 SM Illustration 12 Notebook Page no.

The overhead expense budget for a factory producing to a capacity of 200 units per month is as follows:

Description of Overhead	Fixed Cost per Unit in (₹)	Variable cost Per unit in (₹)	Total cost Per unit in(₹)
Power and fuel	1,000	500	1,500
Repair and maintenance	500	250	750
Printing and stationery	500	250	750
Other overheads	1,000	500	1,500
	₹3,000	₹1,500	₹4,500

The factory has actually produced only 100 units in a particular month. Details of overheads actually incurred have been provided by the accounts department and are as follows:

Description of Overhead	Actual Cost
Power and fuel	₹4,00,000
Repair and maintenance	₹2,00,000
Printing and stationery	₹1,75,000
Other overheads	₹3,75,000

You are required to CALCULATE the Overhead volume variance and the overhead expense Variances,

Que 21 SM Illustration 13 Notebook Page no.

The following information was obtained from the records of a manufacturing unit using standard costing system.

	Standard	Actual
Production	4,000 units	3,800 units
Working days	20	21
Machine hours	8,000 hours	7,800 hours
Fixed Overhead	₹4,00,000	₹3,90,000
Variable Overhead	₹1,20,000	₹ 1,20,000

You are required to CALCULATE the following overhead variance:

(a) Variable overhead variances

(b) Fixed overhead variances

Que 22 SM Exercise Que 7 Notebook Page no.

XYZ Company has established the following standards for factory overheads.

Variable overhead per unit: ₹ 10/-

Fixed overheads per month ₹1,00,000

Capacity of the plant 20,000 units per month.

The actual data for the month are as follows:

Actual overheads incurred ₹3,00,000

Actual output (units) 15,000 units

Required:

CALCULATE overhead variances viz:

(i) Production volume variance

(ii) Overhead expense variance

Que 23 SM Exercise Que 8 Notebook Page no.

A company has a normal capacity of 120 machines, working 8 hours per day for 25 days in a month. The fixed overheads are budgeted at ₹ 1,44,000 per month. The standard time required to manufacture one unit of product is 4 hours.

In the month of April, the company worked 24 days of 840 machine hours per day and produced 5,305 units of output. The actual fixed overheads were ₹1,42,000.

CALCULATE:

(i) Expense variance

(ii) Volume variance

(iii) Total fixed overheads variance

Que 24 SM Exercise Que 9 Notebook Page no.

Following information is available from the records of a factory:

	Budget	Actual
Fixed overhead for the month of june	₹10,000	₹12,000
Production in June (units)	2,000	2,100
Standard time per unit (hrs)	10	--
Actual hours worked in June	-	21,000

CALCULATE:

(i) Fixed overhead cost variance,

(ii) Expenditure variance,

(iii) Volume variance.

Que 25 SM Exercise Que 10 Notebook Page no.

XYZ Ltd. has furnished you the following information for the month of August:

	Budget	Actual
Output (units)	30,000	32,500
Hours	30,000	33,000
Fixed Overhead	₹45,000	₹50,000
Variable overehad	₹60,000	₹68,000
Working days	25	26

Calculate overhead variances.

Que 26 | SM Exercise Que 11 | Notebook Page no.

S.V. Ltd. has furnished the following data:

	Budget	Actual (for the Month of July)
No. of working days	25	2
Production in units	20,000	22,000
Fixed Overheads	₹30,000	₹31,000

Budgeted fixed overhead rate is ₹ 1.00 per hour. In July, the actual hours worked were 31,500.

CALCULATE the following variances:

(i) Volume variance.

(ii) Expenditure variance.

(iii) Total overhead variance.

Que 27 | SM Exercise Que 12 | Notebook Page no.

The following data for Pijee Ltd. is given

	Budget	Actual
Production (units)	400	360
Manhours to produce above	8,000	7,000
Variable overehads (₹)	10,000	9,150

The standard time to produce one unit of the product is 20 hours.

CALCULATE relevant Variable overhead variances.

Que 28 | SM Exercise Que 13

The following data has been collected from the cost records of a unit for computing the various fixed overhead variances for a period:

Number of budgeted working days	25
Budgeted man-hours per day	6,000
Output (budgeted) per man-hour (in units)	1
Fixed overhead cost as budgeted	₹ 1,50,000
Actual number of working days	27
Actual man-hours per day	6,300
Actual output per man-hour (in-units)	0.9
Actual fixed overhead incurred	₹ 1,56,000

CALCULATE fixed overhead variances:

(i) Expenditure Variance

(ii) Volume Variance,

(iii) Fixed Cost Variance.

Que 29 SM Exercise Que 16 Notebook Page no.

Paras Synthetics uses Standard costing system in manufacturing of its product 'Star 95 Mask'.

The details are as follows;

Direct Material 0.50 Meter @ ₹ 60 per meter	₹ 30
Direct Labour 1 hour @ ₹ 20 per hour	₹ 20
Variable overhead 1 hour @ ₹ 10 per hour	₹ 10
Total	₹ 60

During the month of August, 10,000 units of 'Star 95 Mask' were manufactured.

Details are as follows:

Direct material consumed 5700 meters @ ₹ 58 per meter				
Direct labour Hours	?	@	?	₹ 2,24,400
Variable overhead incurred				₹1,12,200

Variable overhead efficiency variance is ₹ 2,000 A. Variable overheads are based on Direct Labour Hours.

You are required to calculate the missing data and all the relevant Variances.

Chapter 14

MARGINAL COSTING

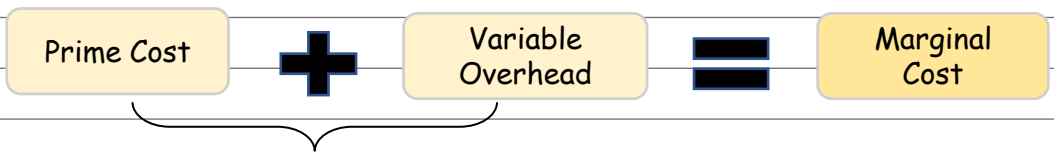
May18	Nov18	May19	Nov19	Nov20	Jan21	Jul21	Dec21	May22
15	10	10	15	10	25	10	10	10

MARGINAL COST

- Marginal cost as understood in economics is the incremental cost of production which arises due to one-unit increase in the production quantity.
- From Costing Point of View: Marginal cost is sum of prime cost and variable overhead

No. of units	Cost
10 units	10,000
11 units	10,500
Marginal cost of	
11th unit	500

Marginal cost shown by below equations:



Example 1

Arnav Ltd. produces 10,000 units of product Z by incurring a total cost of ₹ 3,50,000.

Break-up of costs are as follows:

(i) Direct Material @ ₹ 10 per unit, ₹ 1,00,000,

(ii) Direct employee (labour) cost @ ₹ 8 per unit, ₹ 80,000

(iii) Variable overheads @ ₹ 2 per unit, ₹20,000

(iv) Fixed overheads ₹ 1,50,000 (upto a volume of 50,000 units)

Particular	10,000 units	10,001 units	Change in cost
Direct material			
Direct Employee			
Variable Overhead			
Fixed Overhead			
Total Cost			

MARGINAL COSTING:

- It is a costing system where products or services and inventories are valued at variable costs only.
- It does not take consideration of fixed costs.
- This system of costing is also known as direct costing as only direct costs forms the part of product and inventory cost.
- Costs are classified on the basis of behavior of cost (i.e. fixed and variable) rather functions as done in absorption costing method.

Use of Marginal Costing

- Marginal costing is not a distinct method of costing like job costing, process costing, operating costing, etc., but a special technique used for managerial decision making.
- Marginal costing is used to provide a basis for the interpretation of cost data to measure the profitability of different products, processes and cost centres in the course of decision making.
- It can, therefore, be used in conjunction with the different methods of costing such as job costing, process costing, etc., or even with other techniques such as standard costing or budgetary control.

Product Costs and Period Costs

- The technique of marginal costing is based on the distinction between product costs and period costs.
- Only the variables costs are treated as the costs of the products while the fixed costs are treated as period costs which will be incurred during the period regardless of the volume of output.

Concept of Contribution

- Contribution or contribution margin is the difference between sales revenue and total variable costs irrespective of manufacturing or non-manufacturing.
- The contribution concept is based on the theory that the profit and fixed expenses of a business is a 'joint cost' which cannot be equitably apportioned to different segments of the business.
- In view of this difficulty the contribution serves as a measure of efficiency of operations of various segments of the business.
- The contribution forms a fund for fixed expenses and profit.

Cost Volume Profit (CVP) Analysis

- It is a managerial tool showing the relationship between various ingredients of profit planning viz., cost, selling price and volume of activity.

- As the name suggests, cost volume profit (CVP) analysis is the analysis of three variables cost, volume and profit.

- Assumptions under CVP:
  - ❑ Selling Price p.u., Variable Cost p.u. and Total Fixed Cost will remain constant ;
  - ❑ Total Cost can be separable into Fixed and Variable ;
  - ❑ Total Revenue and Cost are graphically linear ;
  - ❑ In case of multiple products, sales mix is constant ;

- An understanding of CVP analysis is extremely useful to management in budgeting and profit planning. It elucidates the impact of the following on the net profit:
  - ❑ Changes in selling prices ;
  - ❑ Changes in volume of sales ;
  - ❑ Changes in variable cost ;
  - ❑ Changes in fixed cost ;

Contribution

- Contribution or contribution margin is the difference between sales revenue and total variable costs irrespective of manufacturing or non-manufacturing.
- **Equation: Contribution = Sales Revenue – Total Variable Cost**
- The contribution concept is based on the theory that the **profit and fixed expenses** of A business is a '**joint cost**' which **cannot** be equitably **apportioned** to different segments of the business.
- Contribution serves as a **measure** of **efficiency** of **operations** of various segments of the business.
- Contribution is a amount of fund created to contribute towards FC and Profit.

MARGINAL COST EQUATION

Marginal Cost Equation: **S - V = C = F ± P**

where,

S = Sales	F = Fixed Cost
V = Variable Cost	P = Profit/ Loss
C = Contribution	

P/V RATIO

- **Meaning:-**
  - ❑ Also called as Contribution to Sales Ratio, Profit Volume Ratio
  - ❑ This ratio shows the proportion of sales available to cover fixed costs and profit.
  - ❑ A higher contribution to sales ratio implies that the rate of growth of contribution is faster than that of sales.

- **Formula :-**

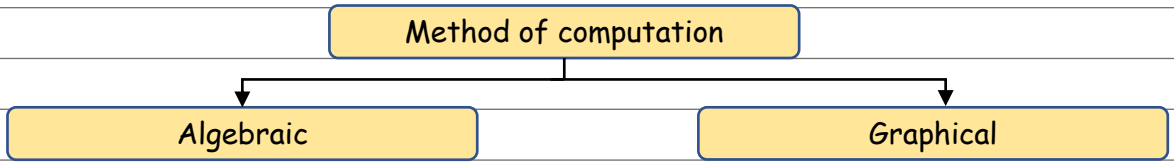
Type	Formula
I	$\text{PV Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$
II	$\text{PV Ratio} = \frac{\text{Change in Contribution}}{\text{Change in Sales}} \times 100$
III	$\text{PV Ratio} = \frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$

- **Also**

Contribution = Sales x PV Ratio
Sales = Contribution / PV Ratio

BREAK EVEN ANALYSIS

- This technique can be explained in two ways:
  - ❑ In narrow sense it is concerned with computing the break-even point. At this point of production level and sales there will be no profit and loss i.e. total cost is equal to total sales revenue.
  - ❑ In broad sense this technique is used to determine the possible profit/loss at any given level of production or sales



- The contribution grows along with the sales revenue till the time it just covers the fixed cost.
- The point where neither profits nor losses have been made is known as a breakeven point.
- This implies that in order to break even the amount of contribution generated should be exactly equal to the fixed costs incurred.

- **Formula :**

Type	Formula
BEP units	$\frac{\text{Fixed Costs}}{\text{Contribution per unit}}$
BEP Value	$\frac{\text{Fixed Costs}}{\text{PV Ratio}}$
Cash BEP	$\frac{\text{Cash Fixed Costs}}{\text{Contribution per unit}}$

Que 1 SM Illustration 1 Notebook Page no.

MNP Ltd sold 2,75,000 units of its product at ₹37.50 per unit. Variable costs are ₹ 17.50 per unit (manufacturing costs of ₹ 14 and selling cost ₹ 3.50 per unit). Fixed costs are incurred uniformly throughout the year and amounting to ₹35,00,000 (including depreciation of ₹ 15,00,000). There are no beginning or ending inventories.

Required:

COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.

Que 2 SM Illustration 2 Notebook Page no.

You are given the following particulars

i. Fixed cost ₹1,50,000
ii. Variable cost ₹ 15 per unit
iii. Selling price is ₹ 30 per unit

CALCULATE:

(a) Break-even point
(b) Sales to earn a profit of ₹ 20,000

SALES to earn Desired Profit

- Target Sales to earn desired profit ;
- For calculating Sales Unit below equation will be used:

$$\frac{\text{Fixed Costs + Desired Profit}}{\text{Contribution per unit}}$$

- For calculating Sales Value below equation will be used:

$$\frac{\text{Fixed Costs + Desired Profit}}{\text{PV ratio}}$$

Example 2

	Case 1	Case 2	Case 3	Case 4	Case 5
Fixed Cost	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000
S.P. p.u.	80	90	?	120	?
V.C. p.u.	64	?	60	?	?
PV Ratio	?	20%	40%	?	40%
BEP Quantity	?	?	?	2500	2500
BEP Sales	?	?	?	?	?

BREAKEVEN ANALYSIS (MULTIPLE PRODUCT)

- In case of multiple product BEP can be calculated assuming the sales mix will not change;
- **Formula:-**

$$\text{Overall BEP} = \frac{\text{Common Fixed Cost}}{\text{Composite Contribution per unit}}$$

- **Composite Contribution p.u.** = Weighted Average contribution of multiple products taking sales mix as their weights.

Que 3 SM Exercise Que 8 Notebook Page no.

The product mix of a Gama Ltd. is as under:

	Products	
	M	N
Units	54,000	18,000
Selling price	₹7.50	₹15.00
Variable Cost	₹6.00	₹4.50

FIND the break-even points in units, if the company discontinues product 'M' and replace with product 'O'. The quantity of product 'O' is 9,000 units and its selling price and variable costs respectively are ₹ 18 and ₹ 9. Fixed Cost is ₹ 15,000.

s

MARGIN OF SAFETY

- The difference between the total sale and the breakeven sales.
- Extra Sales beyond BEP
- **Formula:**

MOS Sales	Total Sales – BEP Sales
BEP Value	$\frac{\text{Profit}}{\text{PV Ratio}}$

Que 4 | SM Illustration 7 | Notebook Page no.

A company earned a profit of ₹ 30,000 during the year. If the marginal cost and selling price of the product are ₹8 and ₹ 10 per unit respectively, FIND OUT the amount of margin of safety.

Que 5 | SM Illustration 8 | Notebook Page no.

A Ltd. Maintains margin of safety of 37.5% with an overall contribution to sales ratio of 40%. Its fixed costs amount to ₹ 5 lakhs.

CALCULATE the following:

i. Break-even sales
ii. Total sales
iii. Total variable cost
iv. Current profit
v. New 'margin of safety' if the sales volume is increased by 7 $\frac{1}{2}$ %.

Que 6 | SM Illustration 3 | Notebook Page no.

A company has a P/V ratio of 40%. COMPUTE by what percentage must sales be increased to offset: 20% reduction in selling price?

Que 7 | SM Illustration 4 | Notebook Page no.

PQR Ltd. has furnished the following data for the two years:

	2019-20	2020-21
Sales	₹8,00,000	?
Profit/ Volume Ratio (P/V ratio)	50%	37.5%
Margin of safety sales as a % of total sales	40%	21.875%

There has been substantial savings in the fixed cost in the year 2020-21 due to the restructuring process. The company could maintain its sales quantity level of 2019- 20 in 2020-21 by reducing selling price.

You are required to CALCULATE the following:

(i) Sales for 2020-21 in Value,
(ii) Fixed cost for 2020-21 in Value,
(iii) Break-even sales for 2020-21 in Value.

Que 8 | SM Exercise 1 | Notebook Page no.

If P/V ratio is 60% and the Marginal cost of the product is ₹ 20. CALCULATE the selling price?

Que 9	SM Exercise 2	Notebook Page no.
	The ratio of variable cost to sales is 70%. The break-even point occurs at 60% of the capacity sales. Find the capacity sales when fixed costs are ₹ 90,000. Also COMPUTE profit at 75% of the capacity sales.	
Que 10	SM Exercise 3	Notebook Page no.
	You are required to-	
	(i) DETERMINE profit, when sales = 2,00,000	
	Fixed Cost = 40,000	
	BEP = 1,60,000	
	(ii) DETERMINE sales, when fixed cost = 20,000	
	Profit = 10,000	
	BEP = 40,000	
Que 11	SM Exercise Que 4	Notebook Page no.
	A company has made a profit of ₹ 50,000 during the year. If the selling price and marginal cost of the product are ₹15 and ₹ 12 per unit respectively, FIND OUT the amount of margin of safety.	
Que 12	SM Exercise Que 5	Notebook Page no.
	(a) If margin of safety is ₹ 2,40,000 (40% of sales) and P/V ratio is 30% of AB Ltd, CALCULATE its (1) Break even sales, and (2) Amount of profit on sales of ₹ 9,00,000	
	(b) X Ltd. has earned a contribution of ₹2,00,000 and net profit of ₹1,50,000 of sales of ₹8,00,000. What is its margin of safety?	
Que 13	SM Exercise Que 6	Notebook Page no.
	A company sells its product at ₹ 15 per unit. In a period, if it produces and sells 8,000 units, it incurs a loss of ₹ 5 per unit. If the volume is raised to 20,000 units, it earns a profit of ₹ 4 per unit. CALCULATE break-even point both in terms of Value as well as in units.	
Que 14	SM Exercise Que 7	Notebook Page no.
	You are given the following data:	

	Sales	Profit
Year 2019-20	₹1,20,000	8,000
Year 2020-21	₹,40,000	13,000

FIND OUT –

(i) P/V ratio,

(ii) B.E. Point,

(iii) Profit when sales are ₹1,80,000,

(iv) Sales required earn a profit of ₹ 12,000,

(v) Margin of safety in year 2020-21.

Que 15 SM Illustration 9 Notebook Page no.

By noting "P/V will increase or P/V will decrease or P/V will not change", as the case may be, STATE how the following independent situations will affect the P/V ratio:

(i) An increase in the physical sales volume;

(ii) An increase in the fixed cost;

(iii) A decrease in the variable cost per unit;

(iv) A decrease in the contribution margin;

(v) An increase in selling price per unit;

(vi) A decrease in the fixed cost;

(vii) A 10% increase in both selling price and variable cost per unit;

(viii) A 10% increase in the selling price per unit and 10% decrease in the physical sales volume;

(ix) A 50% increase in the variable cost per unit and 50% decrease in the fixed cost.

(x) An increase in the angle of incidence

Que 16 SM Illustration 15 Notebook Page no.

M.K. Ltd. manufactures and sells a single product X whose selling price is ₹40 per unit and the variable cost is ₹ 16 per unit.

(i) If the Fixed Costs for this year are ₹ 4,80,000 and the annual sales are at 60% margin of safety, CALCULATE the rate of net return on sales, assuming an income tax level of 40%

(ii) For the next year, it is proposed to add another product line Y whose selling price would be ₹ 50 per unit and the variable cost ₹ 10 per unit. The total fixed costs are estimated at ₹6,66,600. The sales mix values of X : Y would be 7 : 3. DETERMINE at what level of sales next year, would M.K. Ltd. break even? Give separately for both X and Y the break-even sales in rupee and quantities.

Que 17	SM Exercise Que 9	Notebook Page no.
	Mr. X has ₹ 2,00,000 investments in his business firm. He wants a 15 per cent return on his money. From an analysis of recent cost figures, he finds that his variable cost of operating is 60 per cent of sales, his fixed costs are ₹ 80,000 per year.	
	Show COMPUTATIONS to answer the following questions:	
	(i) What sales volume must be obtained to break even?	
	(ii) What sales volume must be obtained to get 15 per cent return on investment?	
	(iii) Mr. X estimates that even if he closed the doors of his business, he would incur ₹25,000 as expenses per year. At what sales would he be better off by locking his business up?	
Que 18	SM Exercise Que 10	Notebook Page no.
	A company had incurred fixed expenses of ₹4,50,000, with sales of ₹ 15,00,000 and earned a profit of ₹ 3,00,000 during the first half year. In the second half, it suffered a loss of ₹ 1,50,000.	
	CALCULATE:	
	(i) The profit-volume ratio, break-even point and margin of safety for the first half year.	
	(ii) Expected sales volume for the second half year assuming that selling price and fixed expenses remained unchanged during the second half year.	
	(iii) The break-even point and margin of safety for the whole year.	
Que 19	SM Exercise Que 12	Notebook Page no.
	A single product company sells its product at ₹ 60 per unit. In 2019-20, the company operated at a margin of safety of 40%. The fixed costs amounted to ₹ 3,60,000 and the variable cost ratio to sales was 80%.	
	In 2020-21, it is estimated that the variable cost will go up by 10% and the fixed cost will increase by 5%.	
	(i) FIND the selling price required to be fixed in 2020-21 to earn the same P/V ratio as in 2019-20.	
	(ii) Assuming the same selling price of ₹ 60 per unit in 2020-21, FIND the number of units required to be produced and sold to earn the same profit as in 2019-20.	

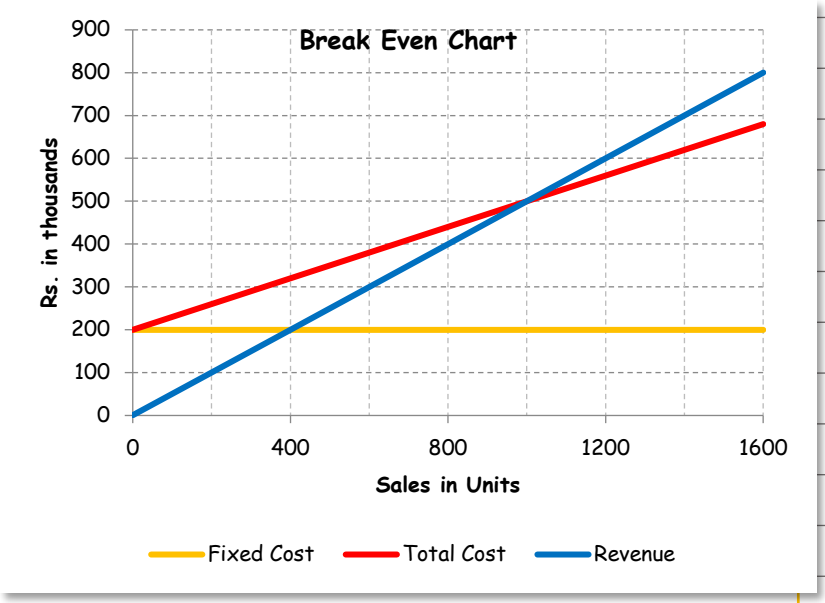
GRAPHICAL PRESENTATION OF BEP

- Graphical BEP
  - Break Even Chart
  - Contribution Break Even Chart
  - Profit Volume Chart

- A breakeven chart records costs and revenues on the vertical axis and the level of activity on the horizontal axis.
- Fixed Cost, Total Cost and Revenue Lines are shown.
- The breakeven point is that point where the sales revenue line intersects the total cost line.
- Other measures like the margin of safety and profit can also be measured from the chart.
- **Limitation**: Contribution can

Given, Fixed Cost is Rs. 200,000
Selling Price is Rs. 500 p.u.
Variable Cost is Rs. 300 p.u.
All Rs in thousands

Units Sold	Fixed Cost	Variable Cost	Total Cost	Revenue
0	200	0	200	0
400	200	120	320	200
800	200	240	440	400
1200	200	360	560	600
1600	200	480	680	800

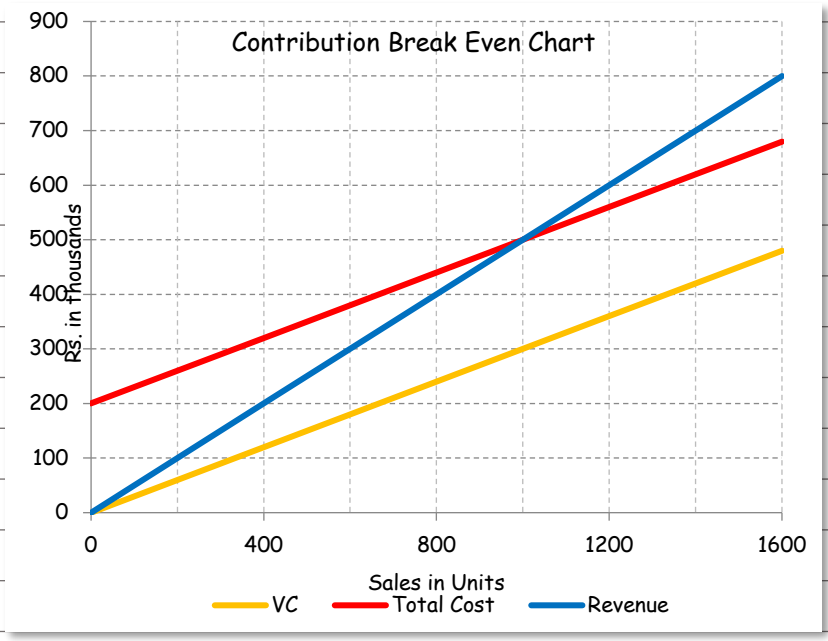


CONTRIBUTION BREAK EVEN CHART

- Similar to Break even chart except Variable Cost Line is shown instead of Fixed Cost Line so that contribution can be presented ;
- Area between Sales line and Variable cost lines shows contribution ;
- Other points are same as Break Even Chart ;
- Data of the graph same as above;

Given, Fixed Cost is Rs. 200,000
Selling Price is Rs. 500 p.u.
Variable Cost is Rs. 300 p.u.
All Rs in thousands

Units Sold	Fixed Cost	Variable Cost	Total Cost	Revenue
0	200	0	200	0
400	200	120	320	200
800	200	240	440	400
1200	200	360	560	600
1600	200	480	680	800

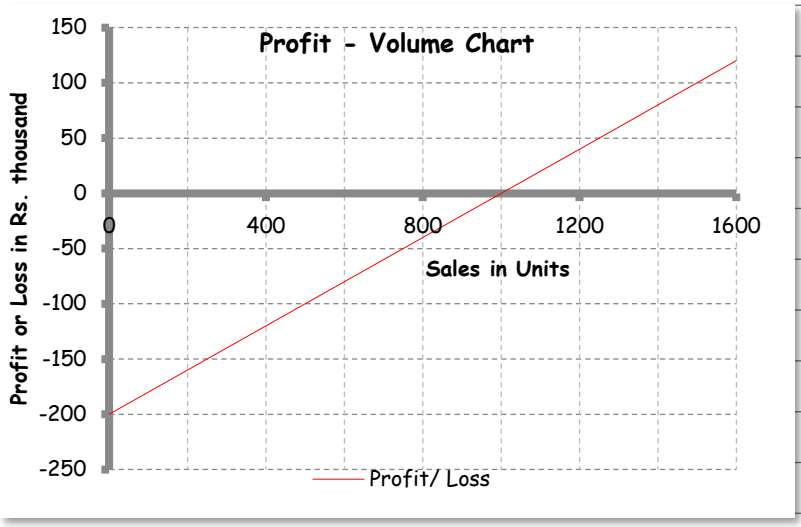


PROFIT VOLUME CHART

- This is also useful for find Breakeven point
- In this chart the vertical axis represents profits and losses and the horizontal axis is drawn at zero profit or loss.
- In this chart each level of activity is taken into account and profits marked accordingly.
- The breakeven point is where this line interacts the horizontal axis.
- **Advantage**: The biggest advantage of the profit-volume chart is its capability of depicting clearly the effect on profit and breakeven point of any changes in the variables.

Given, Fixed Cost is Rs. 200,000
Selling Price is Rs. 500 p.u.
Variable Cost is Rs. 300 p.u.
All Rs in thousands

Units Sold	Fixed Cost	Variable Cost	Total Cost	Revenue	Profit
0	200	0	200	0	-200
400	200	120	320	200	-120
800	200	240	440	400	-40
1200	200	360	560	600	40
1600	200	480	680	800	120

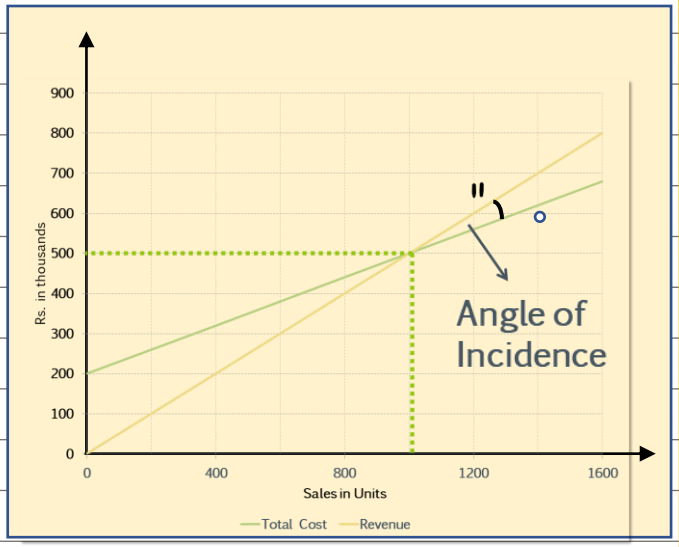


ANGLE OF INCIDENCE

- This angle is formed by the intersection of sales line and total cost line at the breakeven point.
- This angle shows the rate at which profit is earned once the breakeven point is reached.
- The wider the angle the greater is the rate of earning profits.
- A large angle of incidence with a high margin of safety indicates extremely favourable position.

Given, Fixed Cost is Rs. 200,000
Selling Price is Rs. 500 p.u.
Variable Cost is Rs. 300 p.u.
All Rs in thousands

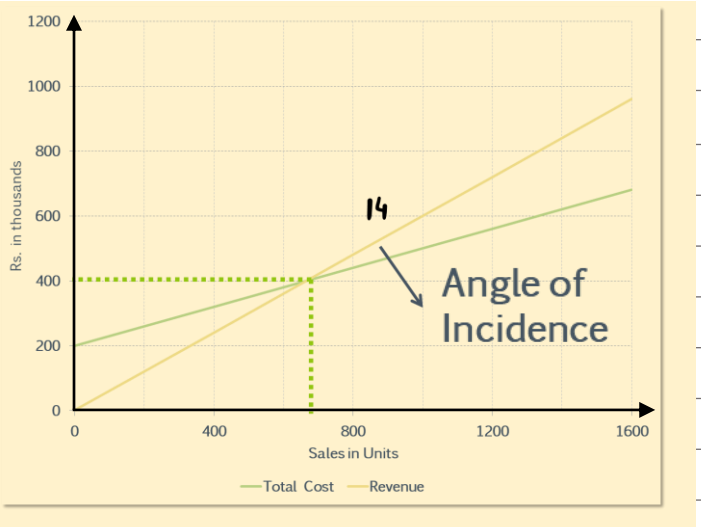
Units Sold	Fixed Cost	Variable Cost	Total Cost	Revenue
0	200	0	200	0
400	200	120	320	200
800	200	240	440	400
1200	200	360	560	600
1600	200	480	680	800



Another example

Given, Fixed Cost is Rs. 200,000
Selling Price is Rs. 600 p.u.
Variable Cost is Rs. 300 p.u.
All Rs in thousands

Units Sold	Fixed Cost	Variable Cost	Total Cost	Revenue
0	200	0	200	0
400	200	120	320	240
800	200	240	440	480
1200	200	360	560	720
1600	200	480	680	960



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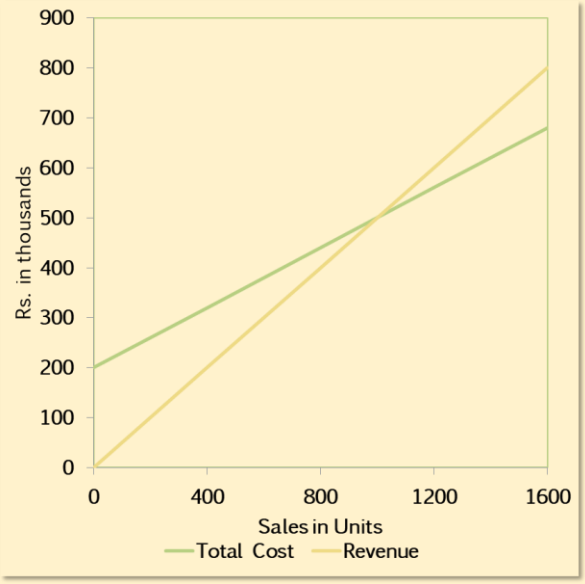
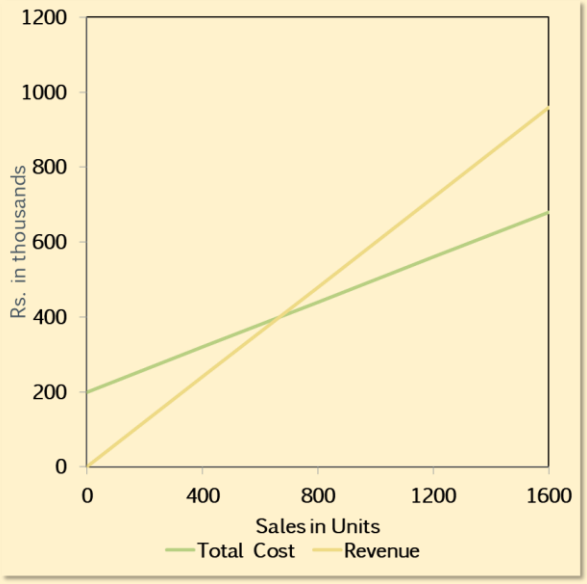
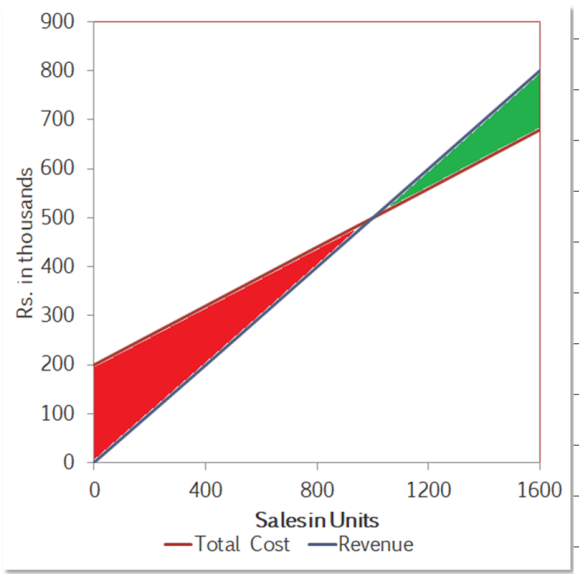
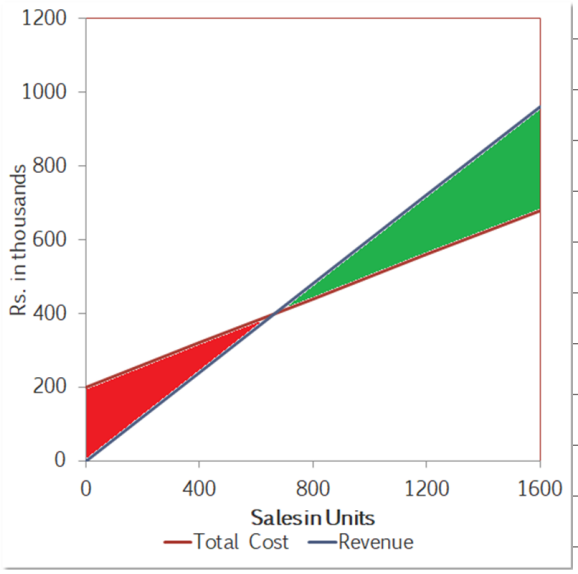


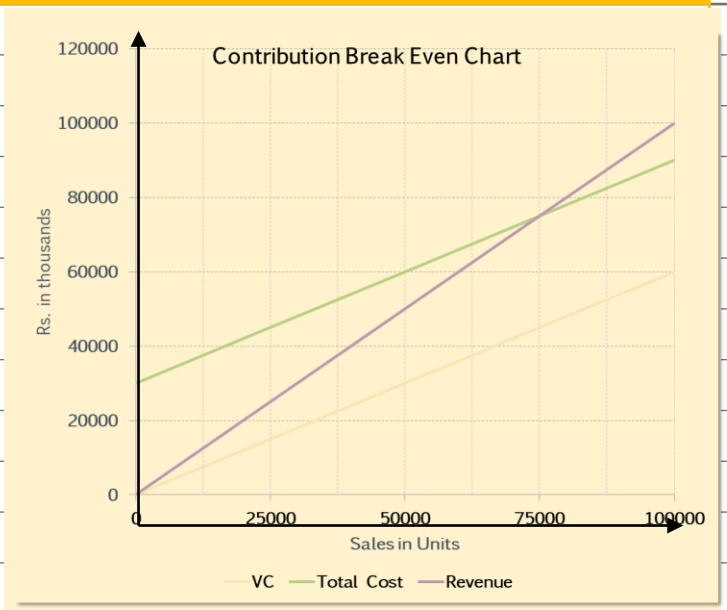






Que 20	SM Illustration 5		Notebook Page no.
	You are given the following data for the current financial year of Rio Co. Ltd:\		
	Variable cost	60,000	60%
	Fixed cost	30,000	30%
	Net profit	10,000	10%
	Sales	1,00,000	100%
	FIND OUT (a) Break-even point, (b) P/V ratio, and (c) Margin of safety. Also DRAW a break-even chart showing contribution and profit.		

Units Sold	Fixed Cost	Variable Cost	Total Cost	Revenue
0	30000	0	30000	0
25000	30000	15000	45000	25000
50000	30000	30000	60000	50000
75000	30000	45000	75000	75000
100000	30000	60000	90000	100000

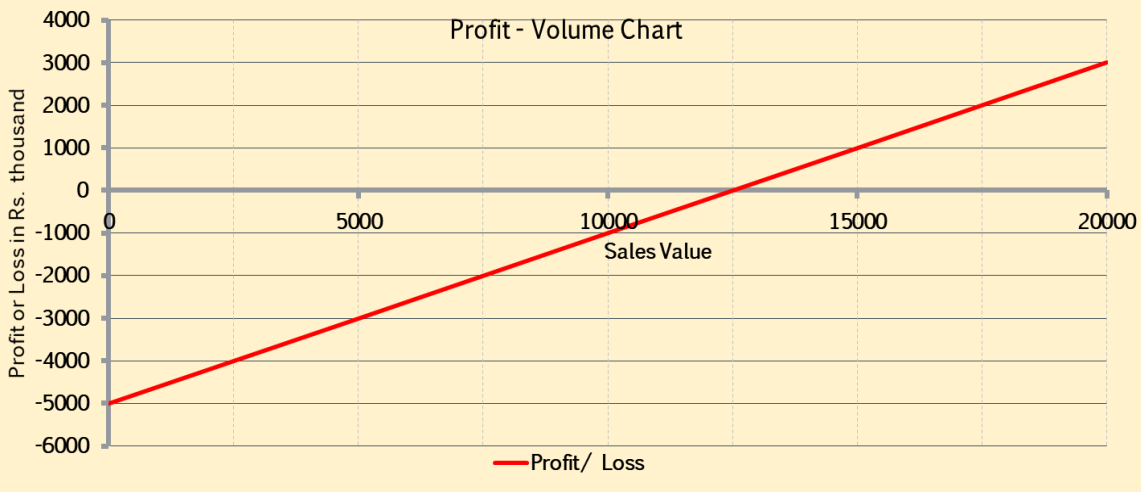


Que 21 SM Illustration 6 Notebook Page no.

PREPARE a profit graph for products A, B and C and find break-even point from the following data:

Products	A	B	C	Total
Sales (₹)	7,500	7,500	3,750	18,750
Variable cost (₹)	1,500	5,250	4,500	11,250
Fixed Cost (₹)	-	-	-	5,000

Sales Value	Fixed Cost	Variable Cost	Total Cost	Profit
0	5000	0	5000	-5000
5000	5000	3000	8000	-3000
10000	5000	6000	11000	-1000
15000	5000	9000	14000	1000
20000	5000	12000	17000	3000



APPLICATION OF CVP ANALYSIS IN DECISION MAKING

- Controllability & Relevance
- **Controllability:** Those cost and benefits which arise due by choosing an option. In other words, benefits received, and cost incurred are directly related with the choice of the option. Thus, the costs and benefits which are controllable are considered for measurement for making decision.
- **Relevance:** The costs which are controllable need to be relevant for decision making. This means all controllable costs are not relevant for decision making unless it differs under the two options.
    - Thus, a cost is treated is relevant only if
        (a) It is a future cost and
        (b) It differs under two options under consideration.
- **Example:** ABC Ltd. wants to manufacture a product either using Machines or by Manual Labor. While evaluating both the options, comparison should be made between cost of machine purchase, machine running or cost of labor. Cost of Material will be irrelevant for decision making as it will not differ under both the options.

ANALYSIS OF COSTS FOR ITS RELEVANCE

Cost	Relevance	Reason
Historical Cost	Irrelevant	The cost has already been incurred and do not affect the decision. Example: Book value of machinery etc.
Sunk Cost	Irrelevant	The cost which are already paid either for goods or services availed or to be availed. Example: Raw material purchased and held in store without having replacement cost, Cost of drawing, blueprint etc.
Committed Cost	Irrelevant	The committed costs are the pre-agreed cost which cannot be revoked under the normal circumstances. This is also a sunk cost. Examples: Cost of materials as per rate agreement, Salary cost to employees etc.
Opportunity Cost	Relevant	The opportunity cost is represented by the forgone potential benefit [contribution lost] from the best rejected course of action. Had the option under consideration not chosen, the benefit would come to the organization.
Notional Cost/	Relevant	Notional costs are relevant for the decision making only if company is actually forgoing benefits by

Imputed Cost		employing its resources to alternative course of action. For example, notional interest on internally generated fund is treated as relevant notional cost only if company could earn interest from it.
Shut Down Costs	Relevant	When an organization suspends its manufacturing operations, certain fixed expenses can be avoided and certain extra fixed expenses may be incurred depending upon the nature of the industry. By closing down the manufacturing, the organization will save variable cost of production as well as some discretionary fixed costs. This particular discretionary cost is known as shut-down cost.

LIMITING FACTORS

- Limiting factor is anything which limits the activity of an entity. The factor is a key to determine the level of sale and production, thus it is also known as Key factor.

- From the supply side the limiting factor may either be Men (employees), Materials (raw material or supplies), Machine (capacity), or Money (availability of fund or budget) and

- From demand side it may be demand for the product, other factors like nature of product, regulatory and environmental requirement etc. The management, while making decisions, has objective to optimise the key resources upto maximum possible extent

Que 22 SM Illustration 14 Notebook Page no.

A company can make any one of the 3 products X, Y or Z in a year. It can exercise its option only at the beginning of each year.

Relevant information about the products for the next year is given below.

	X	Y	Z
Selling Price (₹ / unit)	10	12	12
Variable costs (₹/ unit)	6	9	7
Market demand (unit)	3,000	2,000	1,000
Production Capacity (unit)	2,000	3,000	900
Fixed Costs (₹)	30,000		

Required

COMPUTE the opportunity costs for each of the products.

Que 23 | SM Illustration 11 | Notebook Page no.

ABC Limited produces and sells two product- X and Y. The product is highly demanded in the market. Following information relating to both the products are given as under :

	Per Unit (₹)	
	X	Y
Direct Materials	140	180
Direct Wages	60	100
Variable Overheads (₹ 5 per machine hour)	20	40
Selling price	300	450

The company is facing scarcity of machine hours for working. The availability of machine hours are limited to 60,000 hrs in a month. At present, the monthly demand of product X and product Y is 8,000 units and 6,000 units respectively. The fixed expenses of the company are ₹2,25,000 per month.

You are required to:

DETERMINE the product mix that generates maximum profit to the company in the given situation and also CALCULATE the profit of the company.

Que 24 | SM Illustration 10 | Notebook Page no.

Moon Ltd. produces products 'X', 'Y' and 'Z' and has decided to analyse its production mix in respect of these three products - 'X', 'Y' and 'Z'.

You have the following information:

	X	Y	Z
Direct Materials ₹ (per unit)	160	120	80
Variable Overheads ₹ (per unit)	8	20	12

Direct labour:

Department	Rate per hrs. (₹)	Hours per unit X	Hours per unit Y	Hours per Unit Z
Department A	4	6	10	5
Department B	8	6	15	11

From the current budget, further details are as below :

	X	Y	Z
Annual Production at present (in units)	10,000	12,000	20,000
Estimated Selling Price per unit (₹)	312	400	240

Sales departments estimate of possible sales in the coming year (in units)	12,000	16,000	24,000

There is a constraint on supply of labour in Department-A and its manpower cannot be increased beyond its present level.

Required:

(i) IDENTIFY the best possible product mix of Moon Ltd.

(ii) CALCULATE the total contribution from the best possible product mix.

Que 25 SM Illustration 16 Notebook Page no.

X Ltd. supplies spare parts to an air craft company Y Ltd. The production capacity of X Ltd. facilitates production of any one spare part for a particular period of time. The following are the cost and other information for the production of the two different x spare parts A and B:

		Part A	Part B
Per unit			
Alloy usage		1.6 kgs.	1.6 kgs.
Machine Time: Machine P		0.6 hrs	0.25 hrs.
Machine Time: Machine Q		0.5 hrs.	0.55 hrs.
Target Price (₹)		145	115
Total hours available	Machine P		4,000 hours
	Machine Q		4,500 hours
Alloy available is 13,000 kgs. @ ₹12.50 per kg.			
Variable overheads per machine hours			Machine P: ₹80
			Machine Q: ₹ 100

Required

(i) IDENTIFY the spare part which will optimize contribution at the offered price.

(ii) If Y Ltd. reduces target price by 10% and offers ₹60 per hour of unutilized machine hour, CALCULATE the total contribution from the spare part identified above?

Que 26 SM Illustration 12 Notebook Page no.

PQR Ltd. manufactures medals for winners of athletic events and other contests. Its manufacturing plant has the capacity to produce 10,000 medals each month. The company has current production and sales level of 7,500 medals per month. The current domestic market price of the medal is ₹ 150.

The cost data for the month of August 2021 is as under:

	(₹)
Variable Costs:	
-Direct Materials	2,62,500
- Direct Labour Costs	3,00,000
- Overhead	75,000
Fixed manufacturing costs	2,75,000
Fixed marketing Costs;	1,75,000
	10,87,500

PQR Ltd. has received a special one-time only order for 2,500 medals at ₹ 120 per medal.

Required:

(i) Should PQR Ltd. accept the special order? Why? EXPLAIN briefly.

(ii) Suppose the plant capacity was 9,000 medals instead of 10,000 medals each month. The special order must be taken either in full or rejected totally. ANALYSE whether PQR Ltd. should accept the special order or not.

Que 27 SM Illustration 13 Notebook Page no.

NN Ltd. manufactures automobiles accessories and parts. The following are the total cost of processing 2,00,000 units:

Direct materials cost	₹ 375 per unit
Direct labour cost	₹ 80 per unit
Variable factory overhead	₹ 16 per unit
Fixed factory overhead	₹ 500 lakhs

The purchase price of the component is ₹ 485. The fixed overhead would continue to be incurred even when the component is bought from outside.

REQUIRED:

(a) Should the part be made or bought from outside considering that the present facility when released following a buying decision would remain idle?

(b) In case the released capacity can be rented out to another manufacturer for ₹ 32,00,000 having good demand. What should be the decision?

COST INDIFFERENCE POINT

- It is the particular level of activity at which two options under consideration will give

same profitability.

- At activity level below the indifference points, the alternative with lower fixed costs and higher variable costs should be used.
- At activity level above the indifference point alternative with higher fixed costs and lower variable costs should be used.
- Formula of Cost Indifference Point in units :

$$\frac{\text{Incremental Fixed Cost}}{\text{Savings in VC per unit}}$$

Que 28 SM Exercise Que 18 Notebook Page no.

The following are cost data for three alternative ways of processing the clerical work for cases brought before the LC Court System:

	A	B	C
	Manual (₹)	Semi-automatic (₹)	Fully Automatic(₹)
Monthly fixed costs:			
Occupancy	15,000	15,000	15,000
Maintenance contract	--	5,000	10,000
Equipment lease	--	25,000	1,00,000
Unit Variable costs (per			
Report)			
Supplies	40	80	20
Labour	₹200	₹60	₹20
	(5 hrs x	(1 hr x ₹60)	(0.25 hr x ₹ 80)
	₹40)		

Required:

(i) CALCULATE cost indifference points. Interpret your results.

(ii) If the present case load is 600 cases and it is expected to go up to 850 cases in near future, SELECT most appropriate on cost considerations.

Que 29 SM Exercise Que 21 Notebook Page no.

A company is considering four alternative proposals for a new toy manufacturing Machine launched in the market. New machine is expected to produce approximately 25,000 toys every year.

The proposals are as follows:

(i) Purchase and maintain the new toy manufacturing Machine and bear all related

costs. These machines will run on fuel. The average cost of a Machine is ₹ 10,00,000. Life of the machine is 4 years with annual production of 25,000 toys and the Resale value is ₹2,00,000 at the at the end of the fourth year.

(ii) Hire from Agency-A: It can hire the machine from the Agency-A and pay hire charges rate of ₹20 per toy and bear no other cost.

(iii) Hire from Agency-B: It can hire the machine from the Agency-B and pay hire charges at the rate of ₹ 12 per toy and also bear insurance costs. All other costs will be borne by Agency-B.

(iv) Hire from Agency-C: Hire machine from Agency-C at ₹2,50,000 per year. These machines are more advanced and run on electricity and therefore, the running cost is considerably low. The company will have to bear costs of electricity, licensing fees and spare parts. However, Repairs and maintenance and Insurance cost are borne by Agency-C.

The following further details are available:

The cost of Fuel is ₹ 8 per toy, the cost of spare parts is ₹0.20 per toy and the cost of electricity is ₹ 2 per toy. Further, the cost of Repairs and maintenance is ₹0.25 per toy, the amount of licensing fees to be paid is ₹ 5,000 per machine per annum and the cost of Insurance to be paid is ₹ 25,000 per machine per annum. Consider no taxes.

You are required to:

(i) CALCULATE the relative costs of four proposals on cost per toy basis.

(ii) RANK the proposals on the basis of total cost for 25,000 toys per year.

(iii) RECOMMEND the best proposal to company in view of (ii) above

MARGINAL VS ABSORPTION COSTING

Marginal Costing:

- Product Costs and Period Costs
  - ❑ The technique of marginal costing is based on the distinction between **product costs and period costs.**
  - ❑ Only the variables costs are treated as **the costs of the products** while the fixed costs are treated as **period costs** which will be incurred during the period regardless of the volume of output.

Absorption Costing:

- Absorption Costing is the practice of charging all costs, both variable and fixed to

operations, processes or product.

- In absorption costing the classification of expenses is based on functional basis whereas in marginal costing it is based on the nature of expenses.
- In absorption costing, the fixed expenses are distributed over products on absorption costing basis.

As per Absorption Costing	(₹)
Sales	xx
Production costs:	
Direct Material Cost	xx
Direct Labour cost	xx
Variable Manufacturing Overheads	xx
Fixed Manufacturing Overheads	xx
Cost of Production	xx
Add: Opening Stock of Finished Goods	xx
(calculated in the previous period)	
Less: Closing Stock of Finished goods	(xx)
(pro-rata calculation as per cost of production)	
Cost of Goods Sold	xx
Add: Administrative Overheads (variable & fixed both)	xx
Add: Selling & Distribution Overheads (variable & fixed both)	xx
Total Cost of Sales (Product related)	xx
Add: Under Absorption of Fixed Manufacturing Overheads	xx
Less: Over Absorption of Fixed Manufacturing Overhead	(xx)
Total Cost	xx
Net Profit (Sales- Total cost)	xx

As per Marginal Costing	(₹)
Sales	xx
Variable Production Costs:	
Direct Material Cost	xx
Direct Labour Cost	xx
Variable Manufacturing Overheads	xx
Variable Cost of Production	xx
Add: Opening Stock of Finished Goods	xx
(calculated in the previous period based on variable cost)	
Less: Closing Stock of Finished Goods	(xx)

(pro-rata calculation as per current variable cost of prod.)	
Variable Cost of Goods Sold	xx
Add: Variable Administration Overheads	xx
Add; Variable Selling and distribution overheads	xx
Total Variable Cost	**xx**
Contribution (Sales –Total Variable Cost)	xx
Less: All Fixed Costs	(xx)
Net profit (Contribution – Fixed Cost)	xx

MARGINAL VS ABSORPTION COSTING

Marginal Costing	Absorption Costing
Only variable cost are considered for costing of product and inventory valuation.	Both Fixed and Variable Costs are considered for costing of product and inventory valuation.
Fixed Costs are considered as Period costs.	Fixed costs are charged to production .
Performance of products is judged by PV Ratio.	Performance of products is judged by Net Profit.
The difference in the value of opening and closing stock do not affect unit Cost of production.	The difference in the value of opening and closing stock affect the unit cost of production due to impact of related Fixed Cost.

Que 30 SM Exercise Que 17 Notebook Page no.

XYZ Ltd. has a production capacity of 2,00,000 units per year. Normal capacity utilization is reckoned as 90%. Standard variable production costs are ₹ 11 per unit. The fixed costs are ₹3,60,000 per year. Variable selling costs are ₹ 3 per unit and fixed selling costs are ₹2,70,000 per year. The unit selling price is ₹20.

In the year just ended on 31st March, the production was 1,60,000 units and sales were 1,50,000 units. The closing inventory on 31st March was 20,000 units. The actual variable production costs for the year were ₹35,000 higher than the standard.

(i) CALCULATE the profit for the year

(a) by absorption costing method and

(b) by marginal costing method.

(ii) EXPLAIN the difference in the profits.

Que 31 | SM Illustration 18 | Notebook Page no.

Wonder Ltd. manufactures a single product, ZEST. The following figures relate to ZEST for a one-year period:

Activity Level	50%	100%
Sales and production (units)	400	800
	(₹)	(₹)
Sales	8,00,000	16,00,000
Production :		
Variable	3,20,000	6,40,000
Fixed	1,60,000	1,60,000
Selling & Distribution Costs:		
Variable	1,60,000	3,20,000
Fixed	2,40,000	2,40,000

The normal level of activity for the year is 800 units. Fixed costs are incurred evenly throughout the year, and actual fixed costs are the same as budgeted. There were no stocks of ZEST at the beginning of the year.

In the first quarter, 220 units were produced and 160 units were sold. Required:

(a) COMPUTE the fixed production costs absorbed by ZEST if absorption costing is used?

(b) CALCULATE the under/over-recovery of overheads during the period?

(c) CALCULATE the profit using absorption costing?

(d) CALCULATE the profit using marginal costing?

OTHER QUESTIONS ON CVP ANALYSIS

Que 31 | SM Exercise Que 20 | Notebook Page no.

Prisha Limited manufactures three different products and the following information has been collected from the books of accounts:

	Products		
	A	B	C
Sales Mix	40%	35%	25%
Selling price	₹300	₹400	₹200
Variable Cost	₹150	₹200	₹120
Total Fixed Cost			₹18,00,000

Total Sales	₹60,00,000

The company has currently under discussion, a proposal to discontinue the manufacture of Product C and replace it with Product E, when the following results are anticipated:

	Products		
	A	B	E
Sales Mix	45%	30%	25%
Selling Price	₹300	₹400	₹200
Variable Cost	₹150	₹200	₹120
Total Fixed Costs			₹18,00,000
Total Sales			₹64,00,000

Required:

(i) CALCULATE the total contribution to sales ratio and present break-even sales at existing sales mix.

(ii) CALCULATE the total contribution to sales ratio and present break-even sales at proposed sales mix.

Que 32 SM Exercise Que 11 Notebook Page no.

The following information is given by Star Ltd.:

Margin of Safety	₹1,87,500
Total Cost	₹1,93,750
Margin of Safety	3,750 units
Break-even Sales	1,250 units :

Required: CALCULATE Profit, P/V Ratio, BEP Sales (in ₹) and Fixed Cost

Que 33 SM Exercise Que 14 Notebook Page no.

A company has three factories situated in north, east and south with its Head Office in Mumbai. The management has received the following summary report on the operations of each factory for a period:

	Sales		Profit	
	Actual	Over /Under budget	Actual	Over/under budget
North	1,100	(400)	135	(180)
East	1.450	150	210	90
South	1,200	(200)	330	(110)

CALCULATE for each factory and for the company as a whole for the period:

(i) the fixed costs. (ii) break-even sales.

Que 34 SM Exercise Que 19 Notebook Page no.

XY Ltd. makes two products X and Y, whose respective fixed costs are F1 and F2. You are given that the unit contribution of Y is one-fifth less than the unit contribution of X, that the total of F 1 and F2 is ₹ 1,50,000, that the BEP of X is 1,800 units (for BEP of X, F2 is not considered) and that 3,000 units is the indifference point between X and Y.(i.e. X and Y make equal profits at 3,000 unit volume, considering their respective fixed costs). There is no inventory buildup as whatever is produced is sold.

Required

FIND OUT the values F1 and F2 and units contributions of X and Y. (SM Ex-19)

Que 35 SM Exercise Que 15 Notebook Page no.

An automobile manufacturing company produces different models of Cars. The budget in respect of model 007 for the month of March is as under:

Budgeted Output			40,000 units
		₹ in lakhs	₹ in lakhs
Net Realisation			
Variable costs:			
Materials		79,200	
Labour		15,600	
Direct Expenses		37,200	1,32,000
Specific Fixed Costs		27,000	
Allocated Fixed Cost		33,750	60,750
	Total Cost		1,92,750
	Profit		17,250
	Sales		2,10,000

CALCULATE:

(i) Profit with 10 percent increase in selling price with a 10 percent reduction in sales volume.

(ii) Volume to be achieved to maintain the original profit after a 10 percent rise in material costs, at the originally budgeted selling price per unit.

Que 36 | SM Exercise Que 16 | Notebook Page no.

An Indian soft drink company is planning to establish a subsidiary company in Bhutan to produce mineral water. Based on the estimated annual sales of 40,000 bottles of the mineral water, cost studies produced the following estimates for the Bhutanese subsidiary:

	Total Annual Costs	Percent of Total Annual Cost which is variable
Material	2,10,000	100%
Labour	1,50,000	80%
Factory Overheads	92,000	60%
Administration Expenses	40,000	35%

The Bhutanese production will be sold by manufacturer's representatives who will receive a commission of 8% of the sale price. No portion of the Indian office expenses is to be allocated to the Bhutanese subsidiary.

You are required to

(i) COMPUTE the sale price per bottle to enable the management to realize an estimated 10% profit on sale proceeds in Bhutan.

(ii) CALCULATE the break-even point in rupees sales as also in number of bottles for the Bhutanese subsidiary on the assumption that the sale price is ₹ 14 per. bottle.

Que 37 | SM Exercise Que 13 | Notebook Page no.

(a) You are given the following data for the coming year for a factory.

Budgeted output	8,00,000 units
Fixed expenses	₹ 40,00,000
Variable expenses per unit	₹ 100
Selling price per unit	₹ 200

DRAW a break-even chart showing the break-even point.

(b) If price is reduced to ₹ 180, what will be the new break-even point?

Que 38 | SM Illustration 17 | Notebook Page no.

The profit for the year of R.J. Ltd. works out to 12.5% of the capital employed and the relevant figures are as under:

Sales ₹ 5,00,000

Direct Materials	₹ 2,50,000
Direct Labour…	₹ 1,00,000
Variable Overheads……	₹ 40,000
Capital Employed	₹ 4,00,000

The new Sales Manager who has joined the company recently estimates for next year a profit of about 23% on capital employed, provided the volume of sales is increased by 10% and simultaneously there is an increase in Selling Price of 4% and an overall cost reduction in all the elements of cost by 2%.

Required

FIND OUT by computing in detail the cost and profit for next year, whether the proposal of Sales Manager can be adopted.