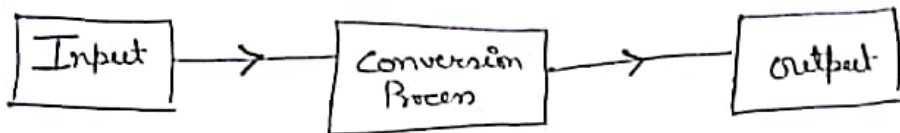


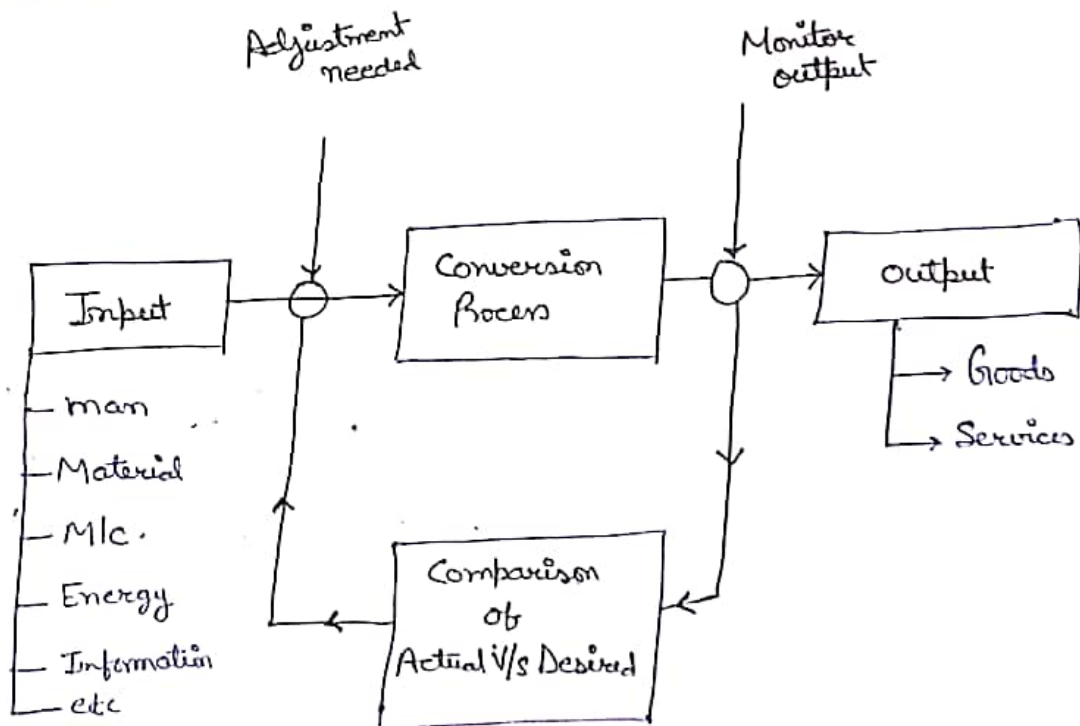
## Production:

It is the Step by Step value addition process of converting one form of material into another form to increase the utility of the product for the user.



## Production System:-

It is an organized process of converting raw material into final product with a feedback loop.



## Productivity :-

$$\text{Productivity} = \frac{\text{Output}}{\text{Input}}$$

It is a Quantitative ratio b/w what we produced and what we use as resources to produce them.

Every organization always want to increase productivity by applying new techniques and methods.

## Industrial Engineer :-

Industrial Engineer is concerned with design, installation and improvement of production system.

Its objective is to eliminate unproductive operations from the production system in order to increase productivity.

## Production Manager :-

Production Manager is concerned with planning, controlling and directing, & day to day working of the production system.

Its objective is to produce "goods & services" of right quality and quantity at pre-determined time and cost.

## i) Cost in Production :

$$1) \text{ Prime or Direct Cost} = [\text{Direct Material} + \text{Direct Labour} + \text{Direct Expenses}]$$

$$2) \begin{array}{l} \text{Factory overhead} \\ \text{or} \\ \text{Factory Expenses} \end{array} = \left[ \begin{array}{l} \text{Indirect Material} + \text{Indirect Labour} \\ + \text{Indirect Expenses} \end{array} \right]$$

↓

Indirect Materials → Cutting fluid, Lubricants, Grease, Cotton, jute  
Stationary items etc.  
+

Indirect Labour → Watchmen, Supervisor, higher officers etc.  
+

Indirect Expenses → Rent, Land, Telephone bills, facility development  
Electricity bills etc. Canteen,

## ii) Factory Cost :-

$$\text{Factory Cost} = \text{Prime Cost} + \text{Factory overhead}$$

## iii) Total Cost :-

$$\text{Total Cost} = \text{Factory Cost} + \text{Marketing, Advertisement, Transportation etc.}$$

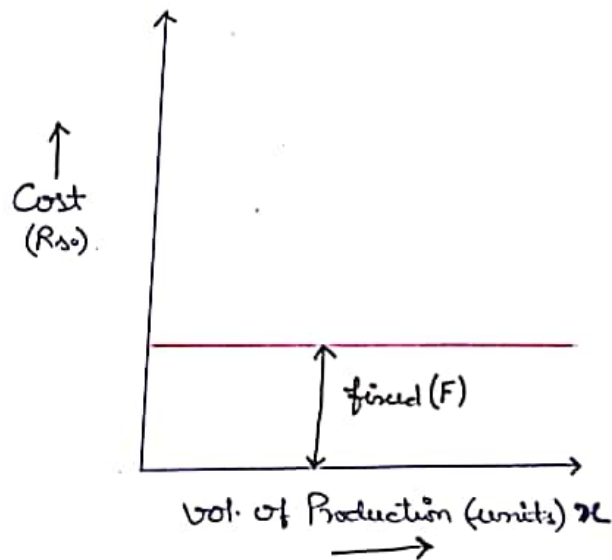
# Break Even Analysis (BEA)

- i) Total Cost
- ii) Selling Cost
- iii) Volume of Production

It is an important tool in the hand of Production Manager to analyse the potential profit and loss possible in the future.

## i) Total Cost :

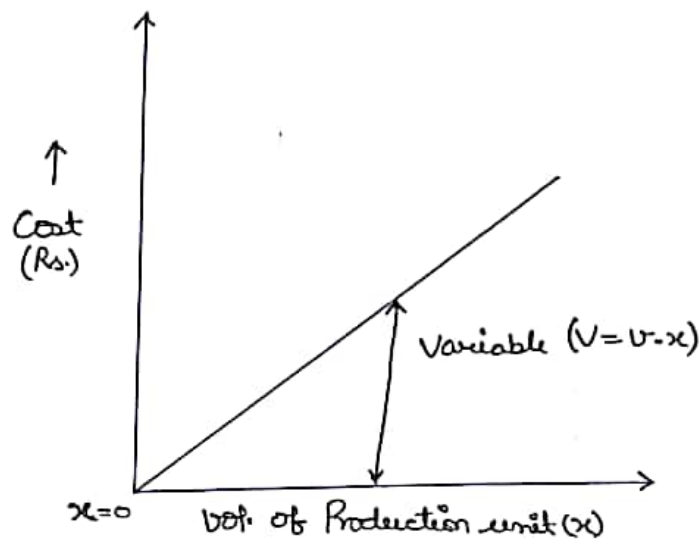
It indicates the expenditure made in order to produce certain number of units and it consists of **fixed and variable cost**.



### a) Fixed Cost :

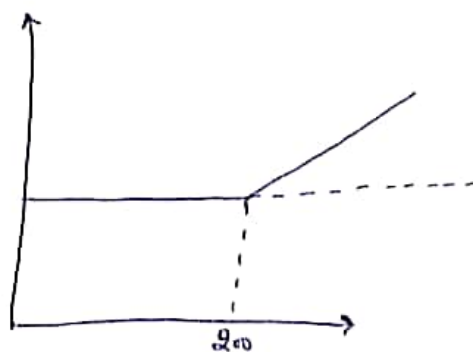
- These cost remains fixed or constant, irrespective of volume of production.
- It include cost of m/c, Salary of Watchmen, higher officers Rent of building, Advertisement Cost, Set up cost, Insurance cost interest of loan taken etc.

### b) Variable Cost ( $V = v \cdot x$ )



- This cost increases directly and proportionally with the volume of production.
- It includes Direct Material, Direct Labour, and Running Cost.

Semi Variable Cost → Some part fixed then variable





$F \rightarrow$  Fixed Cost in Rupees [Rs.]

$x \rightarrow$  No of. unit produced in order to earn Profit of [P Rs.]

$v \rightarrow$  Variable Cost per unit [Rs./unit]

$V \rightarrow$  Total Variable Cost in Rupees [Rs.]  
[ $V = v \cdot x$ ]

$s \text{ or } S \rightarrow$  Selling Cost Per unit [Rs./unit]

$S \rightarrow$  Total Sale or Revenue

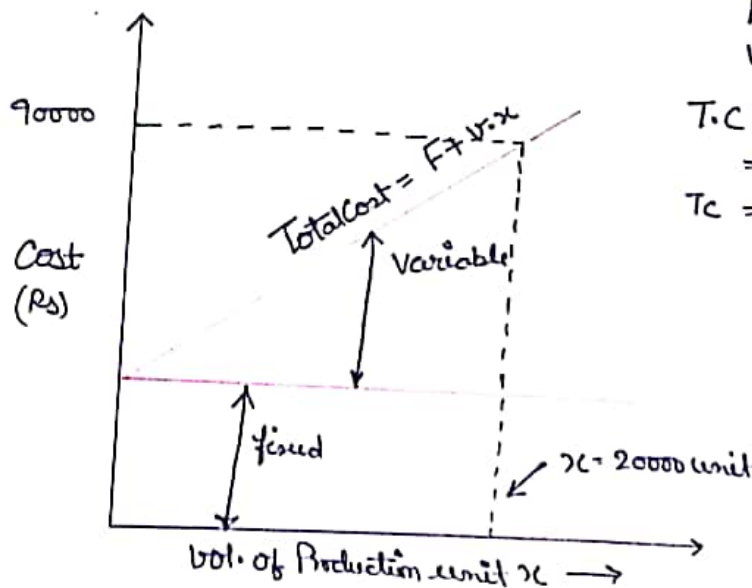
Revenue  $\rightarrow$  section after

$$S = s \cdot x$$

Total Cost :-

$$\text{Total Cost} = F + v \cdot x$$

Total Cost = Fixed Cost + Variable Cost



$$F = 30000$$

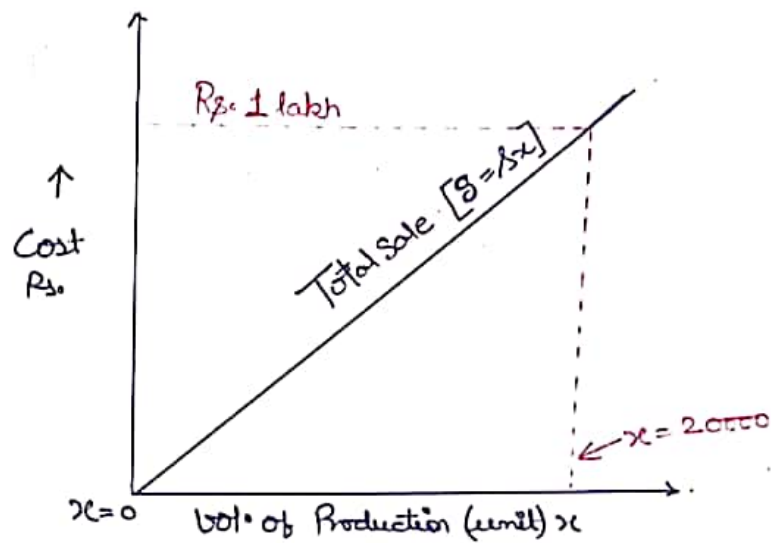
$$v = \text{Rs } 3/\text{unit}$$

$$T.C = F + v \cdot x$$

$$= 30000 + 3 \times 20000$$

$$T.C = 90000 \text{ Rs.}$$

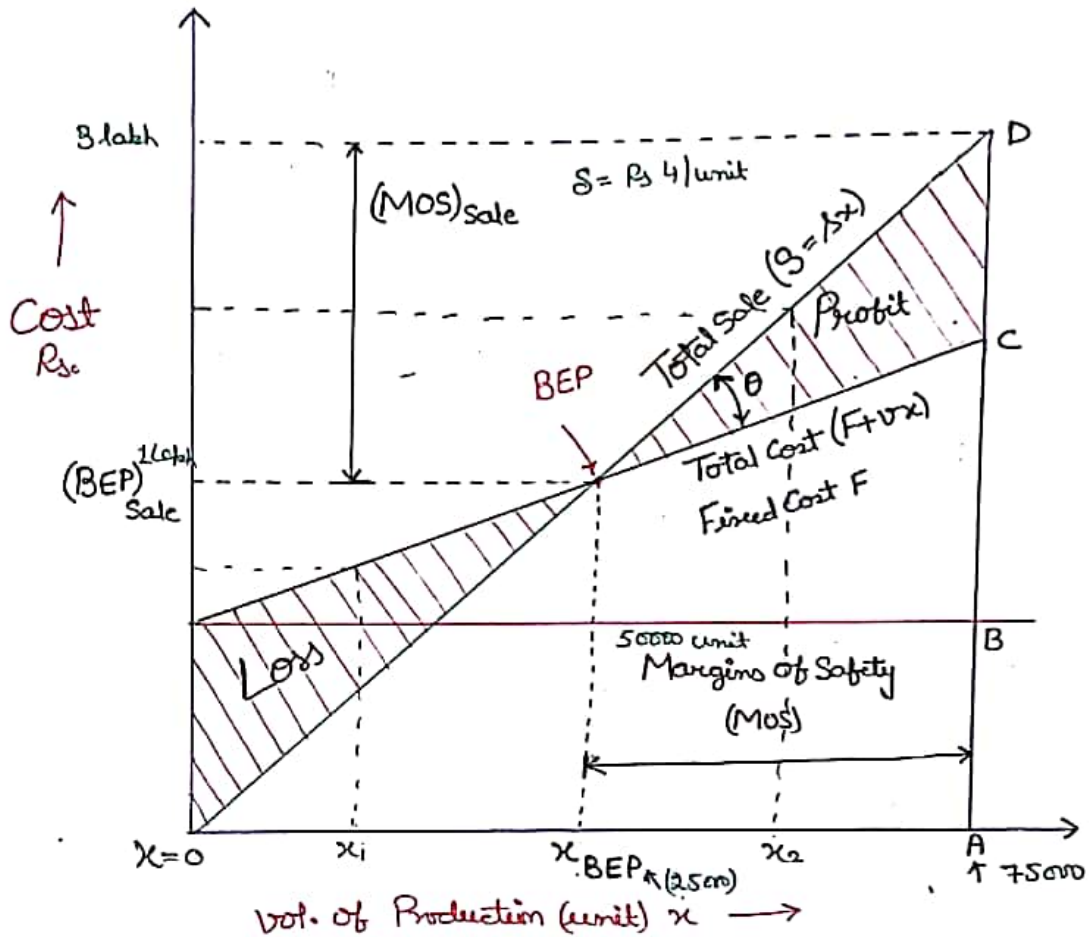
Total Sales or Revenue:  $S = s_x x$



→ It indicates the return obtained by selling of quantity produced.

→ It is directly proportional to the volume of production.

## Break Even Chart :-



### Break Even point :-

- It is the volume of production, where total cost equal to total sale & an organization neither earn profit nor suffer from loss.
- It is also known as (No profit - No loss point).



Total Sale = Total Cost + Profit

$$S = F + V + P$$

$$\text{Total Sale} = S = s \cdot x$$

$$\text{Total Cost} = F + V = F + v \cdot x$$

$$\text{Profit} = P$$

$$S = F + V + P$$

or

$$s \cdot x = F + v \cdot x + P$$

Job  
# derive by this

$$S = s \cdot x$$
$$V = v \cdot x$$

$$(s - v) \cdot x = F + P$$

$$x = \frac{F + P}{s - v} \frac{\text{Rs}}{\text{Rs/unit}} \text{ unit}$$

At BEP;  $P = 0$

$$x = \frac{F}{s - v} \text{ unit}$$

$$(BEP)_{\text{sale}} = x_{\text{BEP}} \cdot s = \frac{F}{(s - v)} \cdot s \text{ Rs.}$$

$s = s \cdot x$