



INDIAN SCHOOL AL WADI AL KABIR
DEPARTMENT OF COMMERCE
PRODUCTION AND COST

1. Define the following:

a. Production function:

It is the relationship between inputs and output produced by a firm.

b. Short run production function:

In short run production function, a firm cannot vary all the inputs, in order to vary the level of output, the firm can vary only the factors other than the fixed.

c. Cost:

Cost refers to the total expenses incurred in the production of a commodity.

d. Fixed cost:

Are the costs which do not change with change in the level of output, eg: rent of building, salaries of permanent employees etc.

e. Total cost:

Total cost comprises both total fixed costs and total variable costs.

Total cost = Total fixed cost + Total variable cost.

f. Variable cost:

Are the costs which change with change in the level of output, eg: cost of raw material, power, fuel, etc.

g. Average cost:

Average cost is per unit cost of production.

$$AC = TC/Q$$

h. Short run:

a. During short run/period both kind of inputs, ie: fixed and variable exist simultaneously.

b. In the short run, all factors of production cannot be changed in the same proportion.

i. Long run:

a. In the long run/period only variable inputs exist because even the fixed inputs of the short period becomes variable in the long period.

b. In the long run, all factors of production can be changed in the same proportion.

2. Give the meaning of Total product, Average product and Marginal product.

- a. **Total product:** refers to total amount of output produced by a firm with given inputs during a period of time.
- b. **Marginal product:** is an addition made to the total product when an additional unit of a variable input is employed.
- c. **Average product:** is the per unit product of a variable factor.

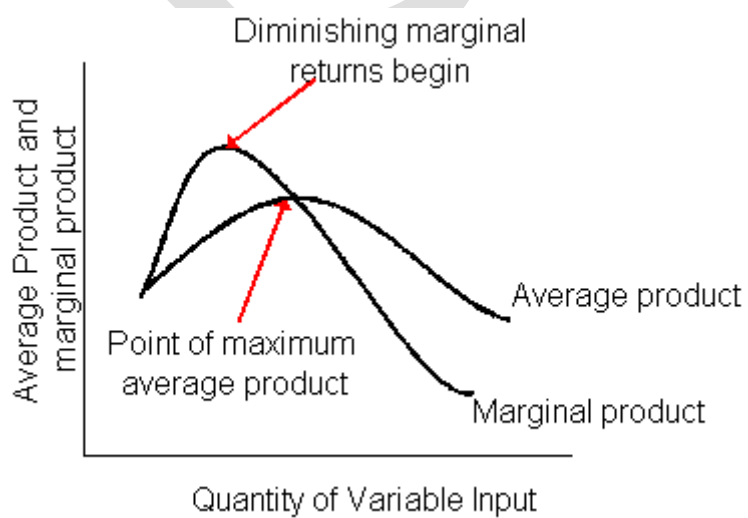
Mathematically:

$$TP = AP \times \text{No. of units}$$
$$TP = AP \times \text{units of the variable factor}$$
$$MP_n = TP_n - TP_{n-1}$$
$$AP = TP / \text{units of variable factor.}$$

3. Explain the relationship between Marginal product and Average product.

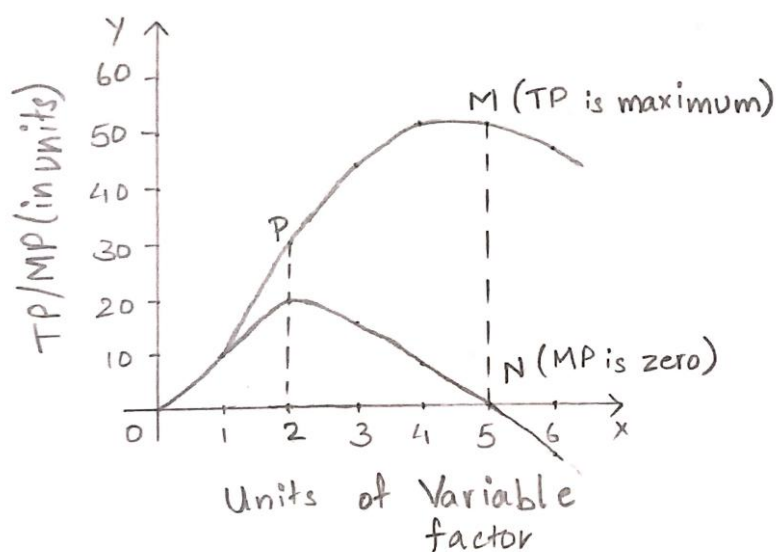
MP determines the behaviour of AP. The relationship between MP and AP is as follows:

- a. when $MP > AP$, then AP is rising.
- b. when $MP = AP$, then AP is constant and maximum.
- c. when $MP < AP$, then AP falls.



4. Explain the relationship between TP and MP.

- when MP rises, TP rises at an increasing rate. when MP falls, TP rises at a diminishing rate.
- when MP is 0, TP is maximum and constant.
- when MP is negative, TP starts falling.



5. Explain the law of variable proportions through the behaviour of total and marginal product. Give reasons. Use diagram.

It states that as we increase the quantity of only one input, keeping other inputs fixed, the total product increases at an increasing rate in the beginning, then increases at a decreasing rate after a level of output and ultimately falls. According to the law the change in TP and MP are classified into three phases:

PHASE – 1:

a. INCREASING RETURNS TO FACTOR:

In this stage, TP rises at an increasing rate, because MP also rises. In this

stage firm is also moving towards an optimum combination of fixed and variable input.

REASONS FOR INCREASING RETURNS TO FACTOR.

- a. better utilisation of fixed factor
- b. increasing efficiency of variable factor
- c. optimum combination of factors.

PHASE -II:

b. DIMINISHING RETURNS TO FACTOR:

Here MP falls and TP rises at a diminishing rate. The rational firm always Operates at the second stage. It doesn't stay in stage one or three. The second stage of law of variable proportion is identified as a significant stage in economics and is known as law of diminishing marginal returns.

REASONS FOR DIMINISHING RETURNS TO FACTOR:

- a. Indivisibility of factors
- b. Imperfect substitutes

PHASE -III

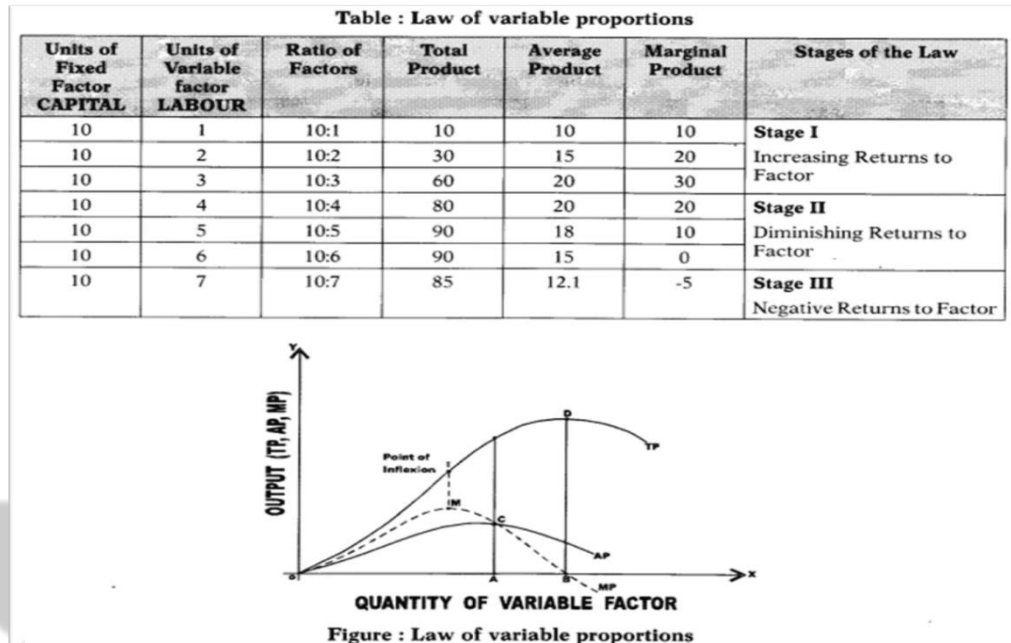
c. NEGATIVE RETURNS TO FACTOR:

MP becomes negative, TP starts falling, TP curve slopes downwards.

REASONS FOR NEGATIVE RETURNS TO FACTOR:

- a. Limitation of fixed factor
- b. Poor coordination bet ween variable and fixed factor.
- c. Decreasing efficiency of variable factors.

This can be explained with the help of a schedule and diagram:



6. Distinguish between Explicit cost and Implicit cost.

a. Explicit cost:

Explicit cost is the cost which are incurred by making payments to the factors hired or purchased. It is paid-out cost. For eg: payment of wages, payment of rent, purchases of raw materials.

b. Implicit cost:

Implicit cost are the costs which are estimated value of inputs provided by the owners themselves. It is paid -in cost. For eg: rent of the owner occupied building, salary for own labour supplied.

7. Distinguish between:

a. Fixed costs and Variable costs:

Fixed cost:

are the costs which do not change with change in the level of output. These costs remain even if the output is zero. Eg: rent for factory

building, wages to permanent staff, interest on capital etc.

Variable cost:

Variable costs are the costs which directly change with change in the level Of output. There are no variable costs at zero level of output. Eg: expenses On raw material used in production, wages to daily workers etc.

b. Average cost and Marginal cost:

Average cost:

Is cost per unit of production. It is calculated by dividing the total cost by number of units produced. $AC = TC / Q$, $AC = AFC + AVC$.

Marginal cost:

Is addition made to total cost when an additional unit of a commodity is produced. It is calculated by dividing the change in total variable cost by change in number of units produced. $MC = \Delta TVC / \Delta Q$,

$$MC_n = TVC_n - TVC_{n-1}$$

8. Draw TC, TFC and TVC curves in a single diagram.

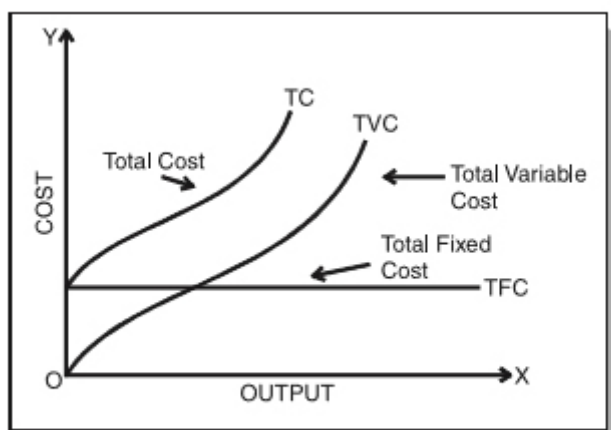


Fig.5 : Short run Total Cost Curves

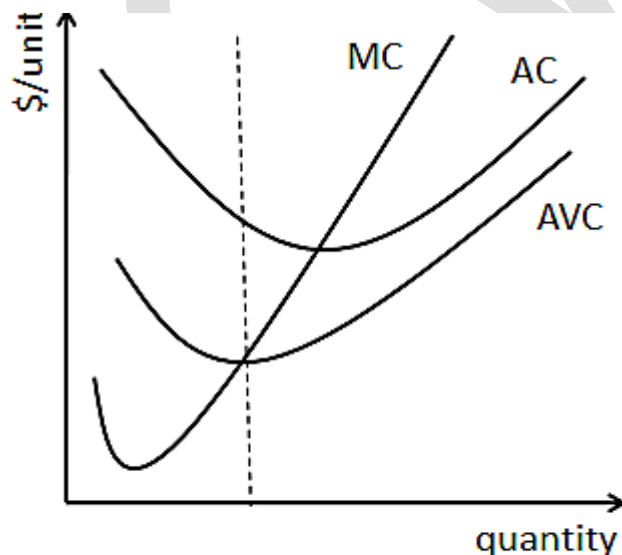
Sum total of all expenditures incurred by the firm in the process of production. It is obtained by summing TFC and TVC at various levels of output. Therefore,

$TC = TFC + TVC$. Since TFC is constant at all levels of output, TC always exceeds TVC by the amount of TFC. To draw the TC curve, we first draw the TFC curve and then vertically add the TVC curve to it. If we draw TVC and TC curves on the same diagram, both will run vertically parallel. The vertical distance between the two is $- TFC = OA$.

9. Difference between TFC and TVC.

Total Variable Costs	Basis	Total Fixed Costs
The cost incurred on variable factors of production is known as TVC.	Meaning	Fixed cost are those costs of production that do not change with a change in output.
It can be changed in the short run.	Changed	It cannot be changed in the short run.
It is zero when there is no production	Cost at zero output	It can never be zero even if there is no production.
It is incurred on variable factors like labour, raw material etc.	Factors of Production	It is incurred on fixed factors like land, buildings etc.

10. Draw AVC, AC and MC curves in a single diagram and explain relation between them.



$MC < AVC$ $MC > AVC$
 AVC decreasing AVC increasing

a. If MC is lower, then AC falls.

- b. If MC is equal, then AC is constant.
- c. If MC is greater, then AC rises.

MC curve cuts both AVC and AC at the minimum points.

11. Relationship between AC and MC:

- a. Both AC and MC are derived from TC. Both AC and MC are U – shaped because of law of variable proportion.
- b. When AC is falling, MC also falls and lies below AC curve.
- c. When AC is rising, MC also rises and lies above AC.
- d. MC cuts AC at its minimum, where $MC = AC$.

12. Important observations on AC, AVC, AFC:

- a. AC curve always lies above AVC because AC includes AVC and AFC at all levels of output.
- b. AVC reaches its minimum point at an output level lower than that of AC because when AVC is at its minimum, AC is still falling because of fall in AFC.
- c. As output increases the gap between AC and AVC curves decreases but they never intersect.

13. Why are AVC and AC curves U- shaped?

- a. The U – shaped of the curves is due to the operation of law of variable proportion.
- b. It states that initially when the variable factor is combined with a fixed factor of production, total cost increases at an increasing rate implying that AC falls.
- c. The best combination of fixed and variable factors occurs at the lowest

point of AC curve. Beyond that point, AC curve starts rising because of over utilisation of the fixed factor.

14. Note on Average fixed cost:

It is obtained: $AFC = TFC / Q$. As output increases, AFC falls because TFC is constant. AFC falls continuously with the level of output. AFC is a rectangular hyperbola. It means that rectangular formed on all the points of the curve has same area. The area of the rectangle is equal to TFC which is constant. Since TFC is constant, area of each rectangle also remains constant. AFC curve falls continuously from left to right but will never

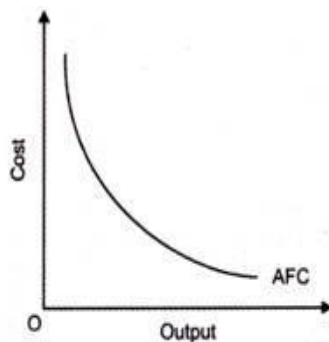


Figure-6: AFC Curve

touch the x – axis because AFC can never be ZERO.

REVENUE AND SUPPLY

15. Define Total revenue, Average revenue and Marginal revenue.

- a. **Total revenue:** refers to the total amount of money received by the firm from the sale of its product. It is obtained by multiplying the price per unit of commodity with the quantity of output sold.

$$TR = \text{Price} \times \text{Output}$$

$$TR = P \times Q$$

- b. **Average revenue:** refers to revenue per unit of commodity sold. It is calculated by dividing the TR by the number of units sold.

$$AR = TR / \text{No. of Units sold.}$$

- c. **Marginal revenue:** refers to the addition made to TR when one more unit of a commodity is sold. $MR_n = TR_n - TR_{n-1}$

16. Define Average revenue. Show that average revenue and price are same.

Average revenue refers to revenue per unit of commodity.

$$\text{Average revenue} = \frac{\text{Total Revenue}}{\text{Units of output sold}}$$

$$\text{Total revenue} = \text{Price} \times \text{Units of output sold}$$

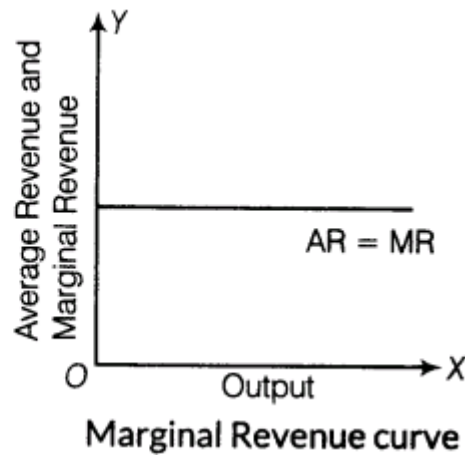
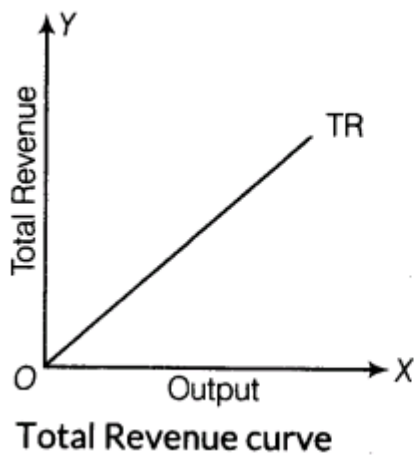
$$AR = \frac{P \times Q}{Q} = \text{price}$$

Therefore, this shows that AR and Price are always same.

17. A firm can sell more units of a good as it wants at a given price. Draw TR, AR and MR curves of a firm. State the relationship between AR and MR curves in this case.

When a firm is free to sell any quantity of the good at a given price, it is a situation of a perfectly competitive market. In such a market, as the sale rises, the price remains unchanged. TR rises but at a constant rate because price is constant. Graphically, TR curve is upward sloping straight line, throughout. When price or AR is constant, AR and MR are equal.

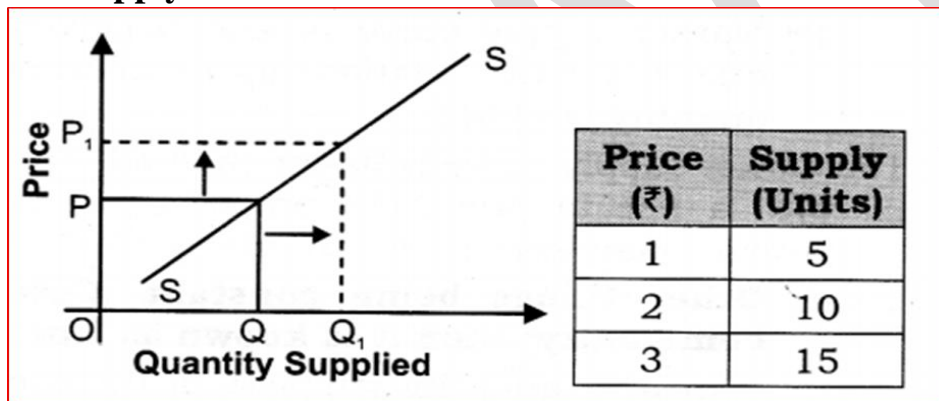
Therefore, MR is also constant. Graphically, MR curve is parallel to x-axis. TR curve is a straight line passing through the origin because TR increases in the same proportion as increase in output sold. The following figures illustrate the idea:



18. Define the following:

a. **Supply:** supply refers to the quantity of commodity that a seller is willing to sell at a given price during a period of time.

b. Supply schedule and curve:

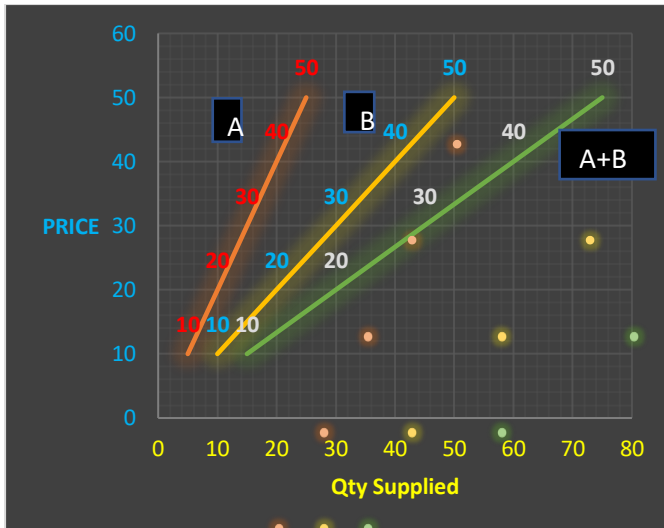


Supply schedule is a table showing the quantity supplied of a commodity by a seller at different prices.

Supply curve: reflects the relationship between the price and quantity supplied graphically.

c. Market supply schedule:

Is a table showing the various quantities of the given good that is offered for sale by all individual firms at different prices.



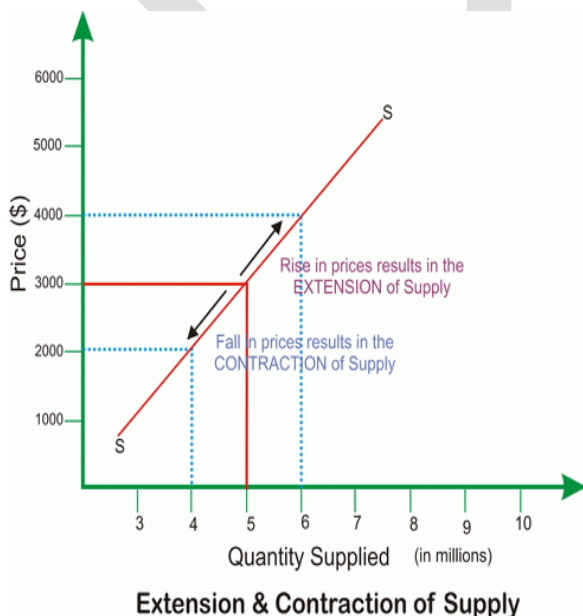
Price	Qty Supplied		Market Supply
	A	B	A+B
10	5	10	15
20	10	20	30
30	15	30	45
40	20	40	60
50	25	50	75

19. Explain the distinction between “change in quantity supplied” and “Change in supply.” Use diagram.

a. Change in quantity supplied or Movement along a supply curve:

is caused by change in price of the commodity alone, other factors remaining constant. change in quantity supplied of a commodity is denoted by the movement along a supply curve.

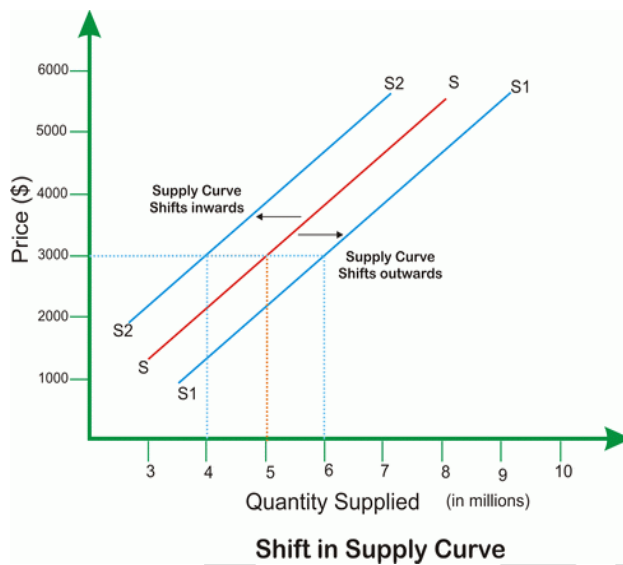
- i. Upward movement along a supply curve denotes Expansion of supply.
- ii. Downward movement along a supply curve denotes Contraction of supply.



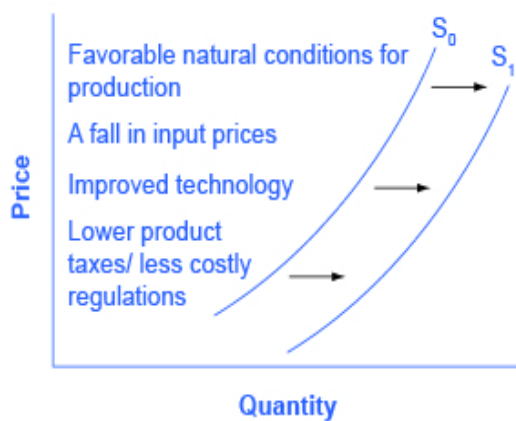
b. Change in supply or Shift in supply curve:

is caused by factor other than the price of the commodity, ie:change in the price of related commodities or change in the state of technology or change in price of inputs etc. change in supply is denoted by a shift of the supply curve.

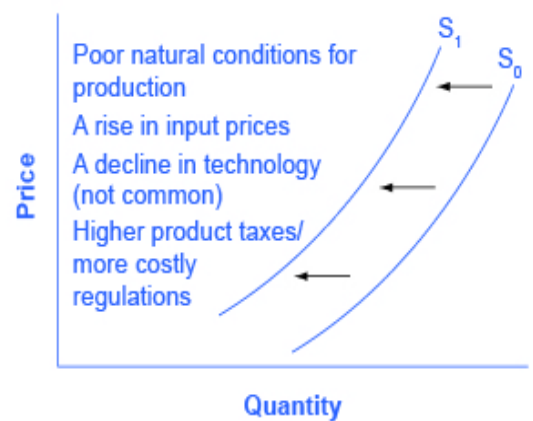
- i. Rightward shift/Outwardshift in supply curve denotes Increase in supply.
- ii. Leftward shift/Inward shift in supply curve denotes Decrease in supply.



20. Explain the causes of rightward shift and leftward shift of curve?



(a) Factors that increase supply



(b) Factors that decrease supply

21. Explain various degrees of price elasticity of supply. Use diagrams.

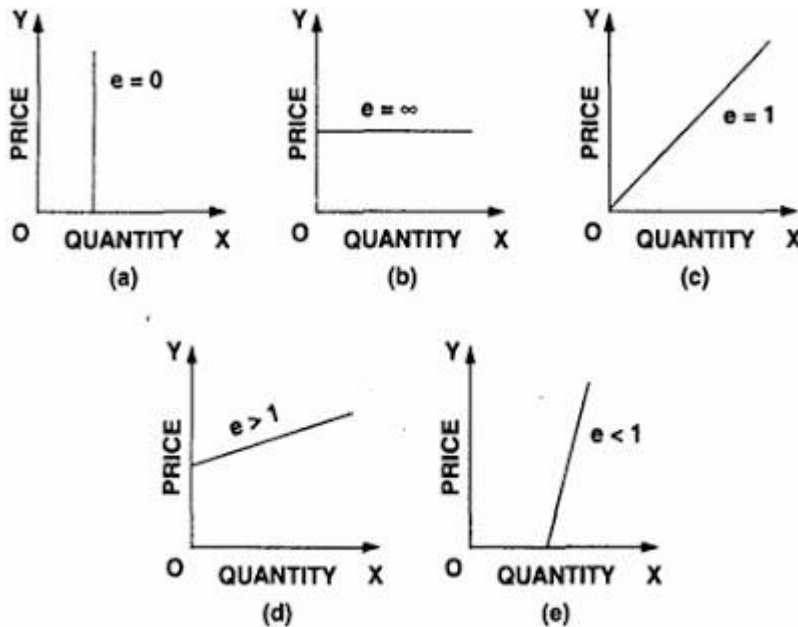


Fig. 2.14 (a) to (e)

a. Perfectly inelastic supply ($E_s = 0$):

It implies that quantity supplied of a commodity does not respond to change in its price.

b. Perfectly elastic supply ($E_s = \infty$):

It implies that its quantity supplied changes irrespective of no change in its price.

c. Unit elastic supply ($E_s = 1$):

It implies that percentage change in its quantity supplied is equal to percentage change in its price.

d. More than unit supply ($E_s > 1$):

It implies that percentage change in its quantity supplied is more than percentage change in its price.

e. Less than unit elastic supply ($E_s < 1$):

It implies that percentage change in quantity supplied of a commodity is less than percentage change in its price.

(Refer the graphs given above)

ISMVK