HOTS & Applications

Q.1. Define short run and long run. How is production function specified for the two periods? Give illustrations.

Ans. Short period is a period of time when production can be increased/decreased only through greater/lesser application of the variable factors (like labour). Fixed factors (like machines) continue to be fixed. Time is too short to change these factors.

Short Period Production Function:

$Y = f(x_1, x_2)$

Here, Y : Maximum possible output of a commodity.

x_1 : Amount of factor-1 which is variable. x_2 : Amount of factor-2 which is constant.

Illustration:

$40_X = f(5L, 4K)$

$45_X = f(6L, 4K)$

Here, X = Commodity-X; L = Labour (variable factor), K = Capital (fixed factor).

We find that output of commodity-X increases from 40 to 45 units when input of labour is increased from 5 to 6 units, input of capital remaining constant (= 4 units).Long period is a period of time when production can be increased/decreased by increasing/decreasing the use of all factors, so that all factors are variable factors. There is nothing like fixed factors of production.

Long Period Production Function:

$Y = f(x_1, x_2)$

Illustration:

$40_X = f(5L, 4K)$

$80_X = f(10L, 8K)$

Implying that output is doubled when both L and K are doubled.

Important it is to note that while studying long period production function, all inputs are changed in the constant ratio.

Short period production function is related to ‘returns to a factor’.
Long period production function is related to ‘returns to scale’.

Q.2. Because of cyclone in a coastal area, fields are flooded. This reduces the productivity of land. How will it affect the supply curve of rice of wheat region?

Ans. A fall in productivity (when fields are flooded owing to cyclone) implies a situation of rise in unit cost of production of wheat. Accordingly, the producer should now be willing to sell less of wheat at the existing price. This would mean a backward shift in supply curve of wheat. Or, supply curve of wheat will shift to the left.

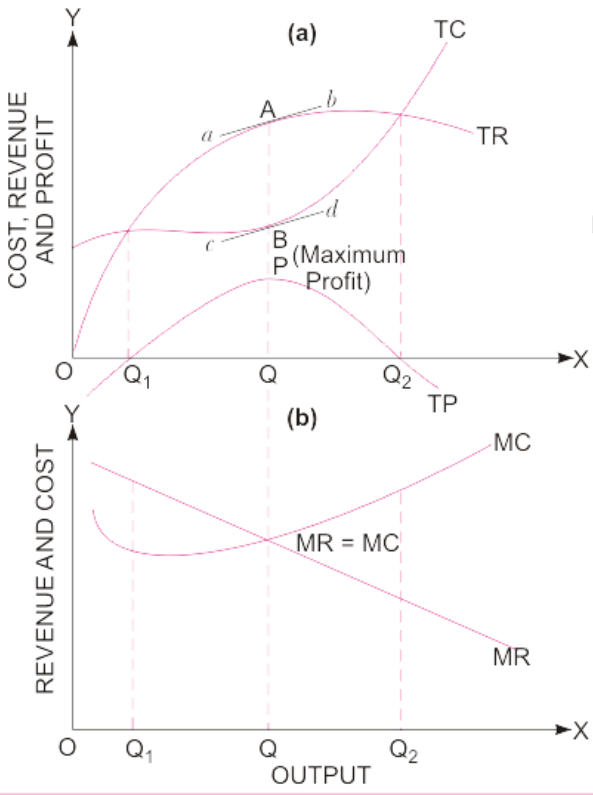
Q.3. Draw a diagram indicating that the difference between TR and TC is maximum only when

i. **MR = MC, and**

ii. **MC is rising.**

Ans.

FIGURE 2



Note: The difference between TR and TC is maximum only when:
(i) MR = MC, and
(ii) MC is rising.

Refer to top half of **Fig. 2.** Corresponding to points A and B, the difference between TR and TC is maximum. (Slope of TR curve at point A) = (Slope of TC curve at point B).

Because, *ab* and *cd* are parallel to each other.

Algebraically, Slope of TR = MR and Slope of TC = MC.

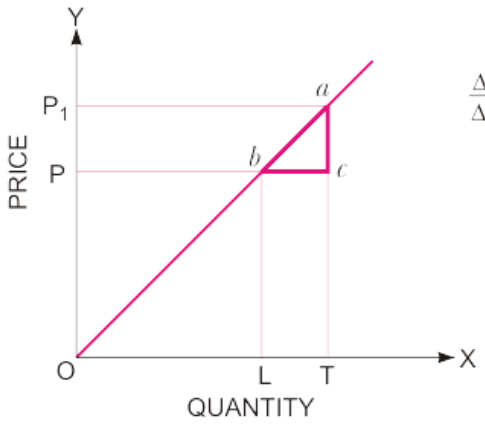
Thus, it is only when MR = MC that the difference between TR and TC is maximum.

Q.4. Elasticity of supply at all points of a straight line upward sloping supply curve shooting from the origin = 1.

Ans. True. Because, at any point on a straight line upward sloping supply curve, slope of supply curve is equal to the ratio So that:

(See **Fig. 3** for illustration.)

FIGURE 3



$$\frac{\Delta P}{\Delta Q}(\text{Slope of Supply Curve}) = \frac{P}{Q}\left(\frac{\text{Price}}{\text{Quantity}}\right)$$

Or

$$\frac{ac}{bc} = \frac{aT}{OT} \quad (\because acb \text{ and } aTO \text{ are similar triangles})$$

Q.5. "Subsidy for the import of defence goods rises from 4% to 6%."

Using a suitable diagram, analyse the impact of the above on the supply of defence goods in the domestic economy.

Ans. When subsidy on the import of defence goods rises from 4% to 6% (other things remaining constant), marginal and average costs of production tend to fall. Accordingly, producers will supply more of defence goods at the existing price, or they will sell the same quantity at a lower price. This implies a forward shift in supply curve to the right or increase in supply. **Fig. 4** illustrates this situation. S_1 is the initial supply curve. When subsidy rises, supply curve will shift forward from S_1 to S_2 .

FIGURE 4