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शक्तिउत्थानआश्रमलखीसरायबिहार

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H.W(Revised)

Question 11:

When does a production function satisfy decreasing returns to scale?

ANSWER:

Decreasing returns to scale (DRS) holds when a proportional increase in all the factors of production leads to an increase in the output by less than the proportion. For example, if both labour and capital are increased by 'n' times but the resultant increase in output is less than 'n' times, then we say that the production function exhibits DRS.

Algebraically, DRS exists when

$$f(nL, nK) < n \cdot f(L, K)$$

Question 12:

Briefly explain the concept of the cost function.

ANSWER:

The functional relationship between the cost of production and the output is called the cost function. It is expressed as

$$C = f(Q_x)$$

Where,

C = Cost of production

Q_x = Units of output x produced

In other words, the output-cost relationship for a firm is depicted by the cost function.

The cost function depicts the least cost combination of inputs associated with different output levels.

Question 13:

What are the total fixed cost, total variable cost and total cost of a firm? How are they related?

ANSWER:

Total Fixed Cost (TFC)

This refers to the costs incurred by a firm in order to acquire the fixed factors for production like cost of machinery, buildings, depreciation, etc. In short run, fixed factors cannot vary and accordingly the fixed cost remains the same through all output levels. These are also called overhead costs.

Total Variable Cost (TVC)

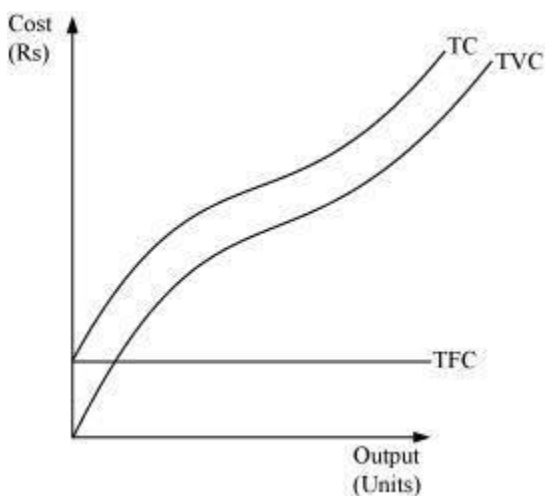
This refers to the costs incurred by a firm on variable inputs for production. As we increase quantities of variable inputs, accordingly the variable cost also goes up. It is also called 'Prime cost' or 'Direct cost' and includes expenses like – wages of labour, fuel expenses, etc.

Total Cost (TC)

The sum of total fixed cost and total variable cost is called the total cost.

Total cost = Total fixed cost + Total variable cost

$$TC = TFC + TVC$$



Relationship between TC, TFC, and TVC

- 1) TFC curve remains constant throughout all the levels of output as fixed factor is constant in short run.
 - 2) TVC rises as the output is increased by employing more and more of labour units. Till point Z, TVC rises at a decreasing rate, and so the TC curve also follows the same pattern.
 - 3) The difference between TC and TVC is equivalent to TFC.
 - 4) After point Z, TVC rises at an increasing rate and therefore TC also rises at an increasing rate.
 - 5) Both TVC and TFC is derived from TC i.e. $TC = TVC + TFC$
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Question 14:

What are the average fixed cost, average variable cost and average cost of a firm? How are they related?

ANSWER:

Average Fixed Cost:

It is defined as the fixed cost per unit of output.

$$AFC = \frac{TFC}{Q}$$

Where,

TFC = Total fixed cost

Q = Quantity of output produced

Average Variable Cost:

It is defined as the variable cost per unit of output.

$$AVC = \frac{TVC}{Q}$$

Where,

TVC = Total variable cost

Q = Quantity of output produced

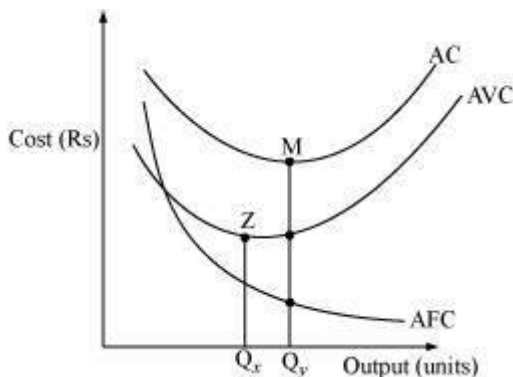
Average Cost:

It is defined as the total cost per unit of output. Average cost is derived by dividing total cost by quantity of output.

$$AC = \frac{TC}{Q}$$

AC is also defined as the sum total of average fixed cost and average variable cost.

$$AC = AFC + AVC$$



Relationship between AC, AFC, AVC:

- 1) AVC and AFC are derived from AC as $AC = AFC + AVC$.
 - 2) The plot for AFC is a rectangular hyperbola and falls continuously as the quantity of output increases.
 - 3) The minimum point of AVC will always exist to the left of the minimum point of AC; i.e., point 'Z' will always lie left to point 'M'.
 - 4) AFC being a rectangular hyperbola falls throughout; this causes the difference between AC and AVC to keep decreasing at higher output levels. However, it should be noted that AVC and AC can never intersect each other. If they intersect at any point, it would imply that AC and AVC are equal at that point. However, this is not possible as AFC will never be zero because it is a rectangular hyperbola that never touches x-axis.
 - 5) AC inherits shape from AVC's shape and it is because of law of variable proportions that both the curves are U-shaped
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Question 15:

Can there be some fixed cost in the long run? If not, why?

ANSWER:

No, there cannot be any fixed cost in the long run. In the long run, a firm has enough time to modify factor ratio and can change the scale of production. There is no fixed factor as the firm can change quantity of all the factors of production and therefore there cannot be any fixed cost in the long-run.

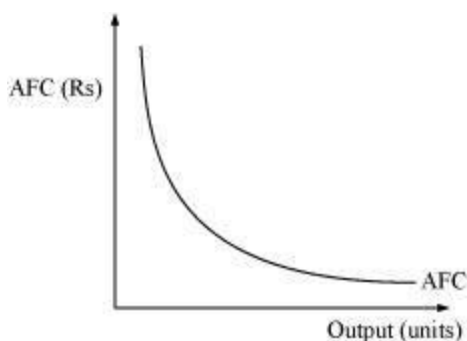
Question 16:

What does the average fixed cost curve look like? Why does it look so?

ANSWER:

Average fixed cost curve looks like a rectangular hyperbola. It is defined as the ratio of TFC to output. We know that TFC remains constant throughout all the output levels and as output increases, with TFC being constant, AFC decreases.

When output level is close to zero, AFC is infinitely large and by contrast when output level is very large, AFC tends to zero but never becomes zero. AFC can never be zero because it is a rectangular hyperbola and it never intersects the x-axis and thereby can never be equal to zero.



Question 17:

What do the short run marginal cost, average variable cost and short run average cost curves look like?

ANSWER:

The short run marginal cost (SMC), average variable cost (AVC) and short run average cost (SAC) curves are all U-shaped curves. The reason behind the curves being U-shaped is the law of variable proportion. In the initial stages of production in the short run, due to increasing returns to labour, all the costs (average and marginal) fall. In addition to this in the short run MP of labour also increases, which implies that more output can be produced by per additional unit of labour, leading all the costs curves to fall. Subsequently with the advent of constant returns to labour, the cost curves become constant and reach their minimum point (representing the optimum combination of capital and labour). Beyond this optimum combination, additional units of labour increase the cost, and as MP of labour starts falling, the cost curve starts rising due to decreasing returns to labour

Question 18:

Why does the SMC curve cut the AVC curve at the minimum point of the AVC curve?

ANSWER:

SMC curve always intersect the AVC curve at its minimum point. This is because to the left of the minimum point of AVC, SMC is below AVC. SMC and AVC both fall but the former falls at a faster rate. At the minimum point K, AVC is equal to SMC. Beyond K, AVC and SMC both rise but the latter rises at a faster rate than the former and also SMC lies above AVC. Therefore, the only point where SMC and AVC are equal is where SMC intersects AVC, i.e., at the minimum point of the AVC curve.

