

NCERT Solutions for Class-XII Economics (Micro)

Chapter-3

Microeconomics Solutions for Class 12 Chapter 3

Q1. Explain the concept of a production function.

Sol. A production function is a function that describes the relationship between the physical input used in production and the corresponding body output. This shows how many input units produce the highest output. It can be represented by:

$$Q_x = f(L, K)$$

When Q_x = Total Body Effect

L = Total physical activity

hire K = Total rental income

Q2. What is the total product of input?

Sol. Specify the total amount of goods and services produced by the company according to the inputs provided over a period of time.

Q3. What is the average product of an input?

Sol. Product Medium in the input product volume divided by the total number of different inputs used to make it.

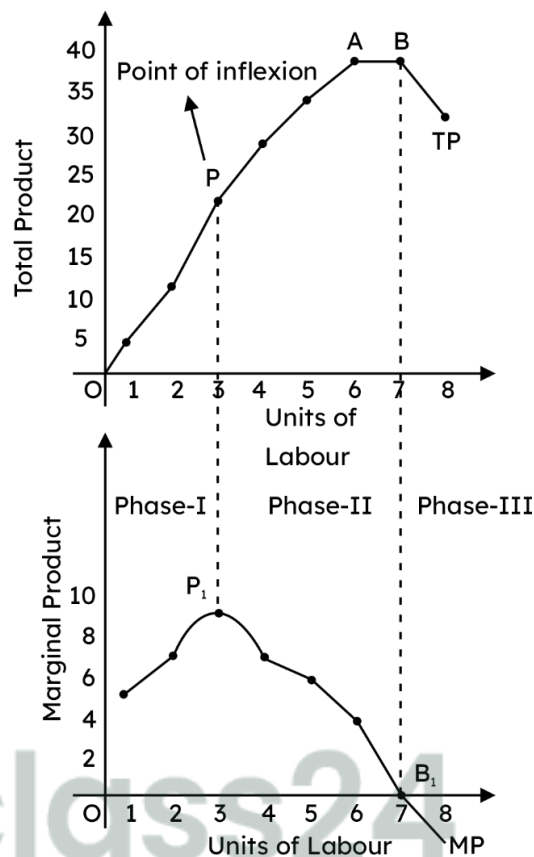
Q4. What is the marginal product of an input?

Sol. The product next to the input is the output of the output obtained through the additional input unit.

Q5. Explain the relationship between the marginal products and the total product of an input.

Sol. This can be explained with the help of the law of variable rates. According to this rule where it is allowed to insert only one variable object to grow and all other inputs are kept unchanged, these changes are recognized:

1. With the growth of Marginal Product (MP), there is a corresponding increase in Total Product (TP). A convex curve is obtained by effect until the MP curve is at a high level.
2. When the MP decreases but agrees, then the TP increases with a decrease in value, which gives the product as a whole concave shape.
3. When MP is zero, TP is high
4. When the MP becomes negative the TP falls.



Q6. Explain the concepts of the short run and the long run.

Sol. Long term is the period of time during which a manufacturer can change all the variables involved in production such as structure, machinery etc. A short period of time is when a manufacturer can make only limited changes to the production system. . It is a time when at least one aspect of production can be improved while others can be replaced or improved. Examples of short runs can be a farmer with a fixed plot of land.

Q7. What is the law of diminishing marginal product?

Sol. According to marginal product reduction law, initially there will be an increase in the amount of production when one item is increased while the other is kept unchanged.

In the end, the strategy could not continue to increase productivity. For example, consider the industry where machinery is a factor in production. Increasing the amount of equipment initially can increase productivity. But if the company continues to increase the number of machines without hiring new staff to use them, production will decline.

Q8. What is the law of variable proportions?

Sol. The Flexible Rates Act is also called the Reduce Reversal Act.

Legally, when one input in production is exchanged while another inputs are kept unchanged, there will be a point after which the output per unit of inputs will start to decrease. This rule is considered under some assumption.

- (i) Technology should always be the same.
- (ii) The likelihood that production features may change over a short period of time.
- (iii) Some inputs must be kept unchanged

Q9. When does a production function satisfy constant returns to scale?

Sol. Regular restitution is achieved when a change in production characteristics is similar to a change in all output. This means that the producer's efforts to improve the product have a fair and equitable advantage.

Q10. When does a production function satisfy increasing returns to scale?

Sol. The increase in return on the scale is achieved when the change in productivity factors exceeds the rate of change in all output. This means that the company has improved its production.

Q11. When does a production function satisfy decreasing returns to scale?

Sol. A decrease in return on the scale is when the change in production characteristics results in a reduction in the change in all output. This is an indication that the changes appear to be detrimental to productivity instead of increasing productivity

Q12. Briefly explain the concept of the cost function.**Sol.** The relationship between production costs and total output is known as the cost function.

Q13. What are the total fixed cost, total variable cost and total cost of a firm? How are they related?

Sol. Fixed costs are fixed costs in relation to the total amount of goods and services produced by a company. Flexible costs, on the other hand, are variable costs compared to the total value of goods and services produced by a company.

Total Fixed Costs: Costs incurred by the company in acquiring fixed production assets such as buildings, equipment costs and depreciation.

Total Flexible Costs: Costs incurred by the company in variable production factors such as wages, fuel costs.

Total Expenses: The total cost of a company is the sum of fixed costs and the total variable costs combined. It is the actual cost incurred by a company in producing a given amount of output.

Q14. What are the average fixed cost, average variable cost and average cost of a firm? How are they related?

Sol. A fixed cost ratio is a fixed cost per unit of output produced
Medium variable costs are variable costs per output unit produced

The median cost of the firm is the average fixed cost and the variable cost included.

Q15. Can there be some fixed cost in the long run? If not, why?

Sol. Fixed costs cannot be set over time. Fixed costs can only be set for a short period of time. Since all aspects of production and input may change over time, fixed costs cannot be determined by output.

Q16. What does the average fixed cost curve look like? Why does it look so?

Sol. The average fixed cost resembles a rectangular hyperbola. This is because of the constantly increasing output and the fixed cost which remains the same at every point.

Q17. What do the short-run marginal cost, average variable cost and short-run average cost curves look like?

Sol. The curves of short-run marginal cost, the average variable cost and the short-run average cost all U-shaped.

Q18. Why does the SMC curve cut the AVC curve at the minimum point of the AVC curve?

Sol. It can be explained by following points:

1. When AVC (Average Variable Cost) falls, SMC (Short Marginal Curve) is lesser than AVC.
 2. When AVC rises, SMC becomes more than AVC
 3. When AVC is constant and is minimum, SMC is equal to AVC.
- Therefore, SMC curve cuts the AVC curve at the minimum point.

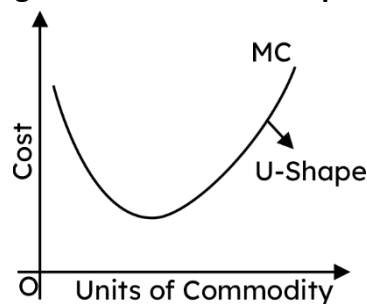
Q19. At which point does the SMC curve intersect SAC curve? Give reason in support of your answer.

Sol. This can be explained with the following points:

1. When SAC falls, SMC is below the SAC
2. When SAC rises, SMC is above SAC

Therefore SMC curve cuts the SAC curve at its minimum point because at that point $SMC = SAC$

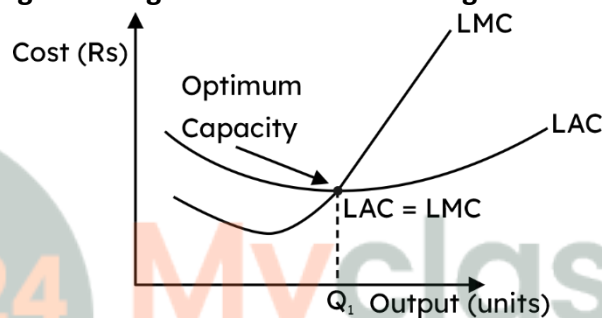
Q20. Why is the short run marginal cost curve 'U'-shaped?



Sol. The Marginal Curve (MC) is U-shaped as per Law of Variable Proportion This can be explained as follows:

1. Shape of Marginal Cost Curve (MC) depends on the Total Variable Cost (TVC).
2. As TVC increases at a diminishing rate, the total product increases at increasing rate, which creates gap in curve leading to fall of MC.
3. Now as TVC increases at an increasing rate and the total product increases at diminishing rate, making the marginal cost to increase and rise upward.
4. The increasing returns and then constant returns along with the rise in decreasing returns makes it appear like letter U from the English alphabet, hence it is named so.

Q21. What do the long run marginal cost and the average cost curves look like?



Sol. The Long Run Marginal Cost (LMC) and Long Run Average Cost (LAC) are U-shaped and the reason behind this is the law of returns to scale. As per this law a company or a firm undergoes three stages in production which are IRS (Increasing Return to Scale), CRS (Constant Return to Scale) and DRS (Diminishing Return to Scale). The curve becomes U-Shaped due to falling of LAC due to economies of scale (IRS), it attains constant output at CRS level and finally if the firm will experience diseconomies of scale and if it is continuing production after this stage it will see a rise or DRS.

Q22. The following table gives the total product schedule of labour. Find the corresponding average product and marginal product schedules of labour.

L	TPL
0	0
1	15
2	35
3	50
4	40
5	48

Sol. The solution for this question is as follows:

L	TP _L	AP = $\frac{TP}{L}$	MP = TP _n - TP _{n-1}
0	0	-	-
1	15	15	15
2	35	17.5	20
3	50	16.67	15
4	40	10	-10
5	48	9.6	8

Q23. The following table gives the average product schedule of labour. Find the total product and marginal product schedules. It is given that the total product is zero at zero level of labour employment.

L	APL
1	2
2	3
3	4
4	4.25
5	4
6	3.5

Sol. The solution for this question is as follows:

L	AP _L	TP _L = AP × L	MP = TP _n - TP _{n-1}
1	2	2 × 1 = 2	2
2	3	3 × 2 = 6	6 - 2 = 4
3	4	4 × 3 = 12	12 - 6 = 6
4	4.25	4.25 × 4 = 17	17 - 12 = 5
5	4	4 × 5 = 20	20 - 17 = 3
6	3.5	3.5 × 6 = 21	21 - 20 = 1

Q24. The following table gives the marginal product schedule of labour. It is also given that total product of labour is zero at zero level of employment. Calculate the total and average product schedules of labour.

L	MPL
1	3
2	5
3	7
4	5
5	3
6	1

Sol. The solution for this question is as follows:

L	MP _L	TP _n = TP _{n-1} + MP _n	AP _L = $\frac{TP_L}{L}$
1	3	3	$\frac{3}{1} = 3$
2	5	3 + 5 = 8	$\frac{8}{2} = 4$
3	7	8 + 7 = 15	$\frac{15}{3} = 5$
4	5	15 + 5 = 20	$\frac{20}{4} = 5$
5	3	20 + 3 = 23	$\frac{23}{5} = 4.6$
6	1	23 + 1 = 24	$\frac{24}{6} = 4$

Q25. The following table shows the total cost schedule of a firm. What is the total fixed cost schedule of this firm?

Calculate the TVC, AFC, AVC, SAC and SMC schedules of the firm.

L	TPL
0	10
1	30
2	45
3	55
4	70
5	90
6	120

Sol. The solution for this question can be as follows:

Q (unit)	TC (Rs)	TFC = TC – TVC 10 = 10 – 0 (Rs)	TVC = TC – TFC (Rs)	AFC = $\frac{TFC}{Q}$ (Rs)	AVC = $\frac{TVC}{Q}$ (Rs)	SAC = AFC + AVC (Rs)	SMC = TC _n – TC _{n-1} (Rs)
0	10	10	0	-	-	-	-
1	30	10	20	10	20	30	20
2	45	10	35	5	17.5	22.5	15
3	55	10	45	3.33	15	18.33	10
4	70	10	60	2.5	15	17.5	15
5	90	10	80	2	16	18	20
6	120	10	110	1.66	18.33	19.99	30

- Q26.** The following table gives the total cost schedule of a firm. It is also given that the average fixed cost at 4 units of output is Rs 5/-. Find the TVC, TFC, AVC, AFC, SAC and SMC schedules of the firm for the corresponding values of output.

L	TPL
1	50
2	65
3	75
4	95
5	130
6	185

Sol. The solution for this question is as follows:

Q (unit)	TC (Rs)	TFC = (Rs) 20 (Rs)	TVC = TC – TFC (Rs)	$AFC = \frac{TVC}{Q}$ (Rs)	$AFC = \frac{TFC}{Q}$ (Rs)	SAC = AFC + AVC (Rs)	SMC = $TC_n - TC_{n-1}$ (Rs)
1	50	20	30	30	20	50	30
2	65	20	45	22.5	10	32.5	15
3	75	20	55	18.33	6.66	24.99	10
4	95	20	75	18.75	5	23.75	20
5	130	20	110	22	4	26	35
6	185	20	165	27.5	3.33	30.83	55

- Q27.** A firm's SMC schedule is shown in the following table. The total fixed cost of the firm is Rs 100. Find the TVC, TC, AVC and SAC schedules of the firm.

L	TPL
0	-
1	500
2	300
3	200
4	300
5	500
6	800

Sol. The solution for this question is as follows:

Q (unit)	SMC (Rs)	TFC = (Rs) 100 (Rs)	$TVC_n = SMC_n +$ TVC_{n-1} (Rs)	TC = TVC + TFC (Rs)	$AVC = \frac{TVC}{Q}$ (Rs)	$SAC = \frac{TC}{Q}$ (Rs)
0	-	100	-	100	-	-
1	500	100	500	600	500	600
2	300	100	800	900	400	450
3	200	100	1000	1100	333.33	366.67
4	300	100	1300	1400	325	350

5	500	100	1800	1900	360	380
6	800	100	2600	2700	433.33	450

Q28. Let the production function of a firm be $Q = 5L^{\frac{1}{2}}K^{\frac{1}{2}}$.

Sol. Find out the maximum possible output that the firm can produce with 100 units of L and 100 units of K.

The solution is as follows :

From the question

$$Q = 5L^{\frac{1}{2}}K^{\frac{1}{2}} \text{ -- Equation (1)}$$

L = 100 units of labour

K = 100 units of capital

Putting these values in equation (1)

$$\begin{aligned} Q &= 5(100)^{1/2} (100)^{1/2} \\ &= 5(10) (10) \\ &= 500 \text{ units} \end{aligned}$$

Therefore, the maximum possible output produced by firm is 500 units.

Q29. Let the production function of a firm be $Q = 2L^2K^2$.

Find out the maximum possible output that the firm can produce with 5 units of L and 2 units of K. What is the maximum possible output that the firm can produce with zero unit of L and 10 units of K?

Sol. The solution is as follows

For 1st condition

$$Q = 2L^2K^2 \text{ -- (Eq. 1)}$$

L = 5 units of labour

K = 2 units of capital

Putting these values in equation (1)

$$\begin{aligned} Q &= 2(5)^2(2)^2 \\ &= 2 (25) (4) \end{aligned}$$

Q = 200 units

For the 2nd Condition

$$Q = 2L^2K^2 \text{ -- (Eq. 1)}$$

If L = 0 units and K = 100 units

Putting these values in equation (1)

$$\begin{aligned} Q &= 2 (0)^2 (100)^2 \\ Q &= 0 \text{ units} \end{aligned}$$

Q30. Find out the maximum possible output for a firm with zero unit of L and 10 units of K when its production function is $Q = 5L + 2K$.

Sol. The solution will be as follows :

As per question

$$Q = 5L + 2K \text{ (eq. 1)}$$

If $L = 0$ and $K = 10$, then putting these values in equation (1)

$$Q = 5(0) + 2(10)$$

$$= 20 \text{ units of output}$$

Therefore, maximum possible output will be 20 units.

