Producer's Behaviour

PART 1
Objective Questions

• Multiple Choice Questions

1. Function showing relationship between input and output is known as ..... .
(a) Consumption function (b) Investment function
(c) Production function (d) Cost function

Ans. (c) Production function

2. What is 'production' in economics?
(a) Creation/Addition to the value of output
(b) Production of foodgrains
(c) Creation of services
(d) Manufacturing of goods

Ans. (a) Production in economics refers to adding value or creating something useful which has a market value.

3. When total product falls, then ..... .
(a) average product is equal to zero
(b) marginal product is equal to zero
(c) marginal product is negative
(d) average product continues to rise

Ans. (c) The movement in TP depends upon change in MP. So, when MP becomes negative, TP starts to diminish.

4. Average Product (AP) is at its maximum when
(a) MP > AP (b) MP < AP
(c) MP = AP (d) MP becomes negative

Ans. (c) Relationship between AP and MP
(i) AP increases as long as MP > AP.
(ii) AP decreases when MP < AP.
(iii) AP is maximum when AP = MP.

5. In which time period, all factors of production become variable and factors of production change with the change in level of production?
(a) Long period (b) Market period
(c) Short period (d) All of these

Ans. (a) Long period is a time period when producer changes both fixed and variable factors of production to change the level of production. There is no difference between fixed and variable factors in the long-run.

6. In the first stage of law of variable proportions, total product increases at an ..... .
(a) decreasing rate (b) increasing rate
(c) constant rate (d) Both (a) and (b)

Ans. (b) In the initial phase of production, all factors of production are highly efficient and hence, TP increases at an increasing rate with employment of each additional variable factor.

7. Increasing returns is applicable because of ..... .
(a) increased efficiency of variable factor
(b) fuller utilisation of fixed factor
(c) indivisibility of factors
(d) Both (a) and (b)

Ans. (d) Attainment of increasing returns to factor depends upon how the fixed factors are utilised along with the variable factors of production.

8. Law of variable proportion is valid when ..... .
(a) atleast one input is fixed and all other inputs are kept variable
(b) all factors are kept constant
(c) all inputs are varied in the same proportion
(d) None of the above

Ans. (a) atleast one input is fixed and all other inputs are kept variable

9. Which of the following curve is not 'U' shaped?
(a) AFC (b) AVC
(c) MC (d) AC

Ans. (a) AFC curve is rectangular hyperbola shaped in nature as TFC remains fixed for all levels of output including zero.

10. Payment made to outsiders for their goods and services are called ..... .
(a) Opportunity cost (b) Real cost
(c) Explicit cost (d) Implicit cost

Ans. (c) Explicit cost

11. When average cost curve is rising, then marginal cost curve ..... .
(a) must be decreasing (b) must be constant
(c) must be rising (d) Any of these

Ans. (c) MC curve lies above AC curve when AC is increasing thus, marginal cost also increases with increase in AC.

12. As output increases, average fixed cost curve ..... .

(a) remains constant (b) starts falling
(c) starts rising (d) None of these

Ans. (b) As output increases, AFC tends to fall continuously but it never becomes zero as TFC is always positive.

13. Area under MC curve is ..... .

(a) total cost (b) total fixed cost
(c) total variable cost (d) None of these

Ans. (c) TVC can be derived by adding each unit of MC, thus the area under MC curve is known as TVC.

14. Average Revenue is equal to ..... .

(a) $\frac{\text{Total Revenue}}{\text{Quantity Sold}}$ (b) $\frac{\text{Average Revenue}}{2}$

(c) $\frac{\text{Total Revenue}}{100}$ (d) $\frac{\text{Average Quantity}}{\text{Quantity Sold}} \times 2$

Ans. (a) $\frac{\text{Total Revenue}}{\text{Quantity Sold}}$

15. When the firm is producing 3 tonnes of sugar, it receives total revenue of ₹ 24. Raising production to 4 tonnes, increases total revenue to ₹ 28. Thus, marginal revenue is ..... .

(a) ₹ 4 (b) ₹ 8
(c) ₹ 28 (d) ₹ 52

Ans. (a) **MR = 28 – 24 = ₹ 4**

16. **Statement I** MC becomes zero when AC is at its minimum point.

Statement II AC, AVC and MC curves always start from the same point.

Alternatives

(a) Statement I is correct and Statement II is incorrect
(b) Statement II is correct and Statement I is incorrect
(c) Both the statements are correct
(d) Both the statements are incorrect

Ans. (b) Statement II is correct and Statement I is incorrect

17. **Statement I** Total revenue is the product of price per unit of output and units sold.

Statement II Average revenue is the slope of marginal revenue.

Alternatives

(a) Statement I is correct and Statement II is incorrect
(b) Statement II is correct and Statement I is incorrect
(c) Both the statements are correct
(d) Both the statements are incorrect

Ans. (a) Statement I is correct and Statement II is incorrect

18. If AR is ₹ 40 per unit from the sale of 3 goods and it is ₹ 30 per unit from the sale of 4 goods. Find the marginal revenue of 4th unit of goods.

(a) ₹ 10 (b) ₹ 30
(c) ₹ 40 (d) 0

Ans. (d) Total revenue from 3 goods sold, $TR_3 = AR \times \mathbf{Q}$
$= \mathbf{40} \times \mathbf{3} = ₹\ 120$

Total revenue from 4 goods sold, $TR_4 = AR \times \mathbf{Q}$
$= \mathbf{30} \times \mathbf{4} = ₹\ 120$

Marginal Revenue $(MR_4) = TR_4 - TR_3$
$= 120 - 120 = \mathbf{0}$

19. Choose the correct pair.

Column I	Column II
A. Overhead cost	(i) Variable cost
B. Total variable cost curve	(ii) Starts from the point of TFC curve
C. Marginal revenue	(iii) Equal to Price when price is constant

Codes

(a) A–(i) (b) B–(ii)
(c) C–(iii) (d) All the pairs

Ans. (c) C–(iii)

• Assertion-Reasoning MCQs

Direction (Q. Nos. 1 to 5) *There are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the appropriate option from options the given below*

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A)
(c) Assertion (A) is true, but Reason (R) is false
(d) Assertion (A) is false, but Reason (R) is true

1. **Assertion** (A) Average product increases only when marginal product increases.

Reason (R) Rate of change of marginal product is greater than rate of change in average product.

Ans. (d) Average product increases so long as marginal product is greater than average product.

2. **Assertion** (A) According to law of diminishing returns to factor, marginal physical product of labour decrease but remains positive.

Reason (R) In the second stage of returns to factor, there is over utilisation of fixed factors.

Ans (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

3. **Assertion** (A) Total variable cost curve is inversely 'S' shaped owing to law of variable proportions.

Reason (R) In the initial stage of production, both fixed and variable factors are underutilised.

Ans. (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

4. **Assertion** (A) During increasing returns to factor, total variable cost increases at a diminishing rate.

Reason (R) In the first phase of law of variable proportions, variable factors are highly efficient.

Ans. (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

5. **Assertion** (A) A rational producer prefer producing in the second stage of law of variable proportion.

Reason (R) In the stage of diminishing returns, AP and MP both falls but AP lies above MP.

Ans. (b) A rational producer produces in the second phase as in this phase, marginal product decreases but remains positive.

• Case Based MCQs

1. **Direction** *Read the following text and answer question no. (i) to (vi) on the basis of the same.*

Farmers in our country are mostly small and marginal. They produce for self-consumption and hardly have any surplus crop to sell in market. These farmers produce with the help of their family members. Also due to limited land holding at times, there are more labour working compared with what is actually required, this leads to disguised unemployment.

Use of primitive tools and techniques further reduces the ability of these families to increase production.

(i) In case of disguised unemployment, marginal product of labour is equal to
(a) zero
(b) positive
(c) negative
(d) Either (a) or (c)

Ans. (a) In case of disguised unemployment, marginal productivity of labour becomes zero. Thus, he/she does not contribute anything to output.

(ii) In case of land, the 'law of returns to factor' is applicable in ..... .
(a) short-run (b) medium-run
(c) long-run (d) None of these

Ans. (a) short-run

(iii) In the above situation, productivity was low due to ..... .
(a) fixity of land
(b) use of primitive tools and techniques
(c) excessive use of variable factor
(d) All of the above

Ans. (d) All of the above

(iv) A rational producer should opt to produce in ..... stage.
(a) increasing-returns to scale
(b) diminishing-returns to scale
(c) constant returns to scale
(d) None of the above

Ans. (b) diminishing-returns to scale

(v) Which of the following is a variable factor of production in farming?
(a) Farming land
(b) Labour
(c) Equipments
(d) Both (b) and (c)

Ans. (d) Labour and equipments are variable factors as they vary directly with the level of output.

(vi) **Assertion** (A) In case of disguised employment, total physical product becomes constant.

Reason (R) When more people work at a place then required, additional workers does not contribute much to the output.

Alternatives
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A)
(c) Assertion (A) is true, but Reason (R) is false
(d) Assertion (A) is false, but Reason (R) is true

Ans. (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

2. **Direction** *Read the following text and answer question no. (i) to (vi) on the basis of the same.*

Revenue is an important aspect of producer's behaviour. In indicates a firm's receipts from sales. In other words, it also indicates the demand for firm's goods and services. More sales usually indicates more revenue but higher sale depends upon the form of market and clasticity of demand. Firms have better control over price when demand is inelastic.

(i) In which form of market, average revenue is inelastic?
(a) Perfect competition (b) Monopoly
(c) Monopolistic (d) None of these

Ans. (b) Monopoly

(ii) Incremental revenue is always equal to price under ..... market.
(a) perfect competition (b) monopoly
(c) monopolistic (d) None of these

Ans. (a) perfect competition

(iii) Average revenue under monopolistic competition is elastic due to

(a) lower price (b) greater choice
(c) price control (d) All of these

Ans. (b) greater choice

(iv) When average revenue is elastic, marginal revenue is

(a) inelastic (b) also elastic
(c) perfectly elastic (d) perfectly inelastic

Ans. (b) also elastic

(v) **Assertion** (A) Total revenue and profits are equal under the market with constant price.

Reason (R) When price becomes constant, additional revenue becomes equal to average revenue.

Alternatives

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A)
(c) Assertion (A) is true, but Reason (R) is false
(d) Assertion (A) is false, but Reason (R) is true

Ans. (d) Profit is the difference between revenue and cost thus, it's not always equal to each other.

(vi) ..... curve represent the demand curve of a firm as mentioned in the given paragraph.

(a) Total revenue
(b) Average revenue
(c) Marginal revenue
(d) None of the above

Ans. (b) Average revenue

PART 2
Subjective Questions

• Short Answer (SA) Type Questions

1. Explain the concept of a production function. **(NCERT)**

Ans. It is the technological knowledge that determines the maximum levels of output that can be produced using different combinations of inputs.

If the technology improves, the maximum levels of output obtainable for different input combinations increase. Then we have a new production function.

e.g., A firm produce a product (Y) by using two inputs $\mathbf{X_1}$ and $\mathbf{X_2}$. Then production function can be expressed as

$$\mathbf{q_y = f(X_1 . X_2)}$$

2. "Average product can never be zero while marginal product can be". Comment.

Ans. MP can become zero when production does not increase with increase in the number of variable factor. On the other hand, AP can never be zero as it is calculated on the basis of TP and variable units of input. Both TP and variable units cannot be zero which makes it impossible for AP to be zero. Hence, it is clear that MP can be zero, but AP will never be zero.

3. Explain the concepts of the short-run and the long-run. **(NCERT)**

Ans. **Short-run** Short-run refers to a period in which output can be changed by changing only variable factors.

In the short- run, fixed inputs like land, building, plant machinery etc, cannot be changed. It means, production can be raised by increasing only variable factors, but till the extent of fixed factors.

Long- run Long-run refers to a period in which output can be changed by changing all factors of production. In the long run, firm can change its factory size, techniques of production, purchase new plant machinery, patents etc.

4. Complete the following data

Units of Labour	**Average Product** (Units)	**Marginal Product** (Units)
1	8	—
2	10	...
3	...	10
4	9	...
5	...	4
6	7	...

Ans.

Units of Labour	**Total Product** (Units) **(AP × L)**	**Average Product** (Units) (TP/L)	**Marginal Product** (Units) **($TP_n - TP_{n-1}$)**
1	8	8	—
2	20	10	**12**
3	30	**10**	10
4	36	9	**6**
5	40	**8**	4
6	42	7	**2**

5. State giving reasons, whether the following statements are true or false.

(i) When there are diminishing returns to a factor, total product first increases and then starts falling?

(ii) When marginal product falls, average product will also fall?

Ans. (i) False, this is because of decline in marginal product. Falling marginal product implies that total product continues to increase at a diminishing rate.

(ii) False, Average product can rise even when marginal product falls.

6. What is meant by returns to a factor? State the law of diminishing returns to a factor.

Ans. **Returns to a Factor** It refers to the behaviour of output when only one variable factor of production is increased in short-run and fixed factors remain constant.

Law of Diminishing Returns to a Factor It refers to a situation in which total output increases at a diminishing rate when more and more variable factor is combined with the fixed factor of production. In this situation, Marginal Product of the variable factor must be diminishing.

7. "Fixed cost of input is ignored in the study of the law of increasing return". Do you agree?

Ans. No, it is not correct. In fact, fixed cost plays an important role in deriving increasing returns from variable inputs.

A firm can leverage its fixed cost to derive better returns due to improved productivity of resources.

e.g. rent is paid every month for the factory space which is fixed cost.

By employing more labours, the production can be maximised and returns of paying rent as fixed cost can be increased. Hence, fixed cost is not ignored in the analysis of law of increasing returns to variable factor.

8. Define variable costs. Explain the behaviour of total variable cost as output increases.

Ans. Variable costs are those costs, which vary directly with the quantity of output produced.

Total variable cost increases with increase in output. Initially, it increases at decreasing rate. Eventually, it increases at an increasing rate.

9. A producer borrows money and opens a shop. The shop premises is owned by him. Identify implicit cost and explicit cost from this information. Also, explain.

Ans. In the above example, interest paid on borrowed money will be explicit cost, whereas, the imputed rent of the shop premises is implicit cost.

Explicit Cost These are those cash payments, which firms make to outsiders for their services and goods. e.g. wages, payment for raw material, rent, interest, etc.

Implicit Cost These are the costs of self-owned and self-employed resources. e.g. entrepreneur may utilise his own building for factory use, interest on self-capital, etc.

10. Complete the following table

Output (Q) (Units)	**Total Variable Cost** (TVC) (₹)	**Average Variable Cost** (AVC) (₹)	**Marginal Cost** (MC) (₹)
1	10	...	...
2	...	8	6
3	27	...	...
4	...	10	13

Ans.

Output (Q) (Units)	**TVC** (₹) (AVC × Q)	**AVC** (₹) (TVC/Q)	**MC** (₹) ($TVC_n - TVC_{n-1}$)
1	10	**10**	**10**
2	**16**	8	6
3	27	**9**	**11**
4	**40**	10	13

11. "Average revenue curve represents law of demand". Discuss.

Ans. Average revenue is determined by dividing total revenue by the quantity sold which indicates price of the commodity. Hence, average revenue curve shows the relationship between price of a commodity and quantity demanded.

It is downward sloping curve because to increase its sales, firms have to lower their prices. So, it possesses all the characteristics of the demand curve. Therefore, we can say that Average Revenue curve represents law of demand.

12. A firm can sell as many units of a good as it wants to sell at a given price. Prepare a schedule showing total revenue, average revenue and marginal revenue of such a firm.

Ans. $TR = AR \times \mathbf{Q}$, $MR_{nth} = TR_n - TR_{n-1}$

Output/Sales (Units) (**Q**)	**Average Revenue = Price** (₹)	**Total Revenue** (₹) (**AR × Q**)	**Marginal Revenue** (₹) ($\mathbf{TR_n - TR_{n-1}}$)
1	5	5	5
2	5	10	5
3	5	15	5
4	5	20	5

13. Explain the relationship between AP and MP.

Ans. Relationship between AP and MP is stated below

(i) AP increases when MP is greater than AP.

(ii) AP is maximum when both MP and AP are equal.

(iii) AP decreases when MP is less than AP.

(iv) AP continues to be positive even when MP is zero or negative.

(v) AP may rise even when MP falls but lies above AP.

14. Explain the relationship between Marginal Cost and Average Cost using diagram.

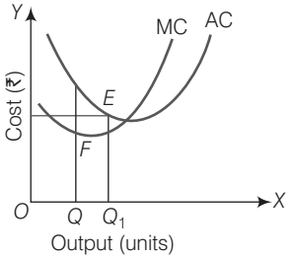
Ans. Relationship between Marginal Cost (MC) and Average Cost (AC) is stated below

(i) When AC falls, MC is lower than AC.

(ii) When AC rises, MC is greater than AC.

(iii) When AC is constant and minimum, MC is equal to AC.

(iv) MC is always to the left of AC and cuts AC from its lowest point.



15. Why AC curve is 'U' shaped?

Ans. The main reason for this 'U' shaped AC curve is the operation of the law of variable proportion. We know as output increases, law of increasing return operates in the initial stages. At this stage, when a firm increases its output, it gets economies and the result is decline in average cost. After the point of optimum combination, economies turn into diseconomies and result in increase in output and average cost. This is the stage of law of diminishing returns.

16. Complete the following table

Output (Units)	**Average Fixed Cost** (AFC) (₹)	**Marginal Cost** (MC) (₹)	**Total Cost** (TC) (₹)
1	...	...	**72**
2	...	10	82
3	20	8	...
4	...	...	99
5	12	10	...

Ans.

Output (**Q**) (Units)	**TFC** (₹) (**AFC** × **Q**)	**AFC** (₹) (**TFC**/**Q**)	**TVC** (₹) (**AVC** × **Q**)	**MC** (₹) ($\mathbf{TVC_n - TVC_{n-1}}$)	**TC** (₹) (**TFC** + **TVC**)
1	60	**60**	12	**12**	72
2	60	**30**	22	10	82
3	60	20	30	8	**90**
4	60	**15**	39	**9**	99
5	60	12	49	10	**109**

17. State giving reasons, whether the following statements are true or false

(i) When Total Revenue is constant, Average Revenue will also be constant.

(ii) When Marginal Revenue falls to zero, Average Revenue becomes maximum.

(iii) Marginal Revenue is always the price at which the last unit of the commodity is sold.

(iv) When Marginal Revenue is positive and constant, Average Revenue and Total Revenue will both increase at constant rate.

Ans. (i) False, when Total Revenue is constant, Average Revenue will be diminishing.

(ii) False, when Marginal Revenue is zero, Average Revenue will be diminishing.

(iii) False, Marginal Revenue can never be the price at which the last unit of the commodity is sold. It simply refers to additional revenue, when an additional unit of output is sold.

(iv) False, because when Marginal Revenue is positive and constant, Total Revenue increases at constant rate but Average Revenue tends to be equal to Marginal Revenue.

18. Complete the following table.

Output (Units)	Price (₹)	Total Revenue (₹)	Marginal Revenue (₹)
4	9	36	—
5	...	...	4
6	...	42	...
7	6	...	...
8	...	40	...

Ans.

Output (Q) (Units)	Price (*P*) (₹) (TR/*Q*)	Total Revenue (TR) (₹) ($P \times Q$)	Marginal Revenue (MR) (₹) ($TR_n - TR_{n-1}$)
4	9	36	—
5	**8**	**40**	4
6	**7**	42	**2**
7	6	**42**	**0**
8	**5**	40	**– 2**

19. Calculate total revenue from the following data

Output	Average Revenue
0	10
1	10
2	10
3	10
4	10
5	10

Ans.

Output	Average Revenue	Total Revenue
0	10	-
1	10	10
2	10	20
3	10	30
4	10	40
5	10	50

TR = AR X Q

20. Complete the following table

Price (₹)	Output (Units)	Total Revenue (₹)	Marginal Revenue (₹)
7	...	7	...
...	2	10	...
...	3	...	–1
1	...	...	– 5

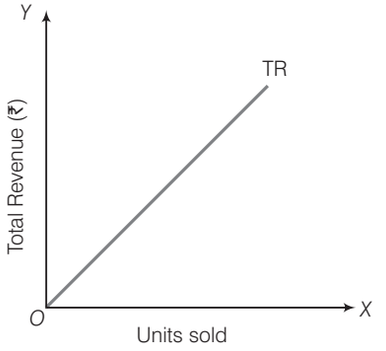
Ans.

Price (P) (AR) (₹) (TR/*Q*)	Output (Q) (Units) (TR/*P*)	Total Revenue (TR) (₹) ($P \times Q$)	Marginal Revenue (MR) (₹) ($TR_n - TR_{n-1}$)
7	**1**	7	**7**
5	2	10	**3**
3	3	**9**	– 1
1	**4**	**4**	– 5

21. Why the total revenue curve of a competitive firm faces a straight line passing through origin?

Ans. A competitive firm sells its output at the uniform price. The price or AR is constant and MR is also constant which is equal to AR.

The Total Revenue is the sum total of MR corresponding to different levels of output. Since, MR is constant, TR increases at a constant rate. Thus, TR curve is a straight line. It passes through the origin because when sale is zero, TR is also zero.



22. The following table gives the Average Product (AP) schedule of labour.

Find the Total Product (TP) and Marginal Product (MP) schedules. It is given that the Total Product is zero at zero level of labour employment. **(NCERT)**

Labour	1	2	3	4	5	6
Average Product	2	3	4	4.25	4	3.5

Ans.

Units of Labour (L)	Average Product (AP)	Total Product ($TP = AP/L$)	Marginal Product ($MP_{nth} = TP_n - TP_{n-1}$)
1	2.00	2	—
2	3.00	6	**6 – 2 = 4**
3	4.00	12	**12 – 6 = 6**
4	4.25	17	**17 – 12 = 5**
5	4.00	20	**20 – 17 = 3**
6	3.50	21	**21 – 20 = 1**

23. 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. **(NCERT)**

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

Ans.

Labour (L)	**MP of Labour** (Units)	**TP** (Units)	**AP** (Units); $\mathbf{AP = \frac{TP}{L}}$
1	3	3	3
2	5	**3 + 5 = 8**	4
3	7	**8 + 7 = 15**	5
4	5	**15 + 5 = 20**	5
5	3	**20 + 3 = 23**	4.60
6	1	**23 + 1 = 24**	4

• Long Answers (LA) Type Questions

1. State giving reasons, whether the following statements are true or false

(i) Average Variable Cost falls even when Marginal Cost is rising.

(ii) The difference between Total Cost and Total Variable Cost falls with increase in output.

(iii) As soon as Marginal Cost starts rising, Average Variable Cost also starts rising.

(iv) Average Cost falls only when Marginal Cost falls.

(v) The difference between Average Total Cost and Average Variable Cost is constant.

(vi) As output is increased, the difference between Average Total Cost and Average Variable Cost falls and ultimately becomes zero.

Ans. (i) True, Average Variable Cost can fall even when Marginal Cost is rising as minimum point of MC lies to the left of AVC.

(ii) False, because the difference between Total Cost and Total Variable Cost is equal to Total Fixed Cost which remains constant at all levels of output.

(iii) False, Average Variable Cost can fall even when Marginal Cost is rising.

(iv) False, Average Cost can fall even when Marginal Cost is rising.

(v) False, the difference between AVC and ATC is AFC which can never be constant. Since, AFC tends to decline with increase in output, the difference between ATC and AVC must reduce as output increases.

(vi) False, because as output increases, the difference between ATC and AVC falls but can never be zero. The difference is equal to AFC, which must remain positive, even when it is falling.

2. Discuss the causes of increasing returns to a factor.

Ans. Increasing returns to a factor occur because of the following factors

(i) **Fuller Utilisation of the Fixed Factor** In the initial stages, fixed factor remains underutilised. Its fuller utilisation is possible by adding additional units of the variable factor to total output and the Marginal Product of the variable factor tends to increase.

(ii) **Increased Efficiency of the Variable Factor** Additional application of the variable factor causes process based division of labour that raises efficiency of the factor. Accordingly, marginal productivity of the factor tends to rise.

(iii) **Better Coordination between the Factors** So long as fixed factor remains underutilised, additional application of the variable factor tends to improve. As a result, total output increases at an increasing rate.

3. Discuss the causes of diminishing returns to a factor.

Ans. Diminishing returns to a factor or the law of diminishing returns may be explained in terms of the following factors

(i) **Fixity of the Factor** It is the principal cause behind the law of diminishing returns.

As more and more units of the variable factor is combined with the fixed factor, the latter gets excessively utilised, leading to decrease in its productivity.

(ii) **Imperfect Factor Substitutability** Factors of production are imperfect substitutes of each other. e.g. more and more of labour cannot be continuously used in place of additional capital.

Accordingly, diminishing returns to the variable factor become inevitable.

(iii) **Poor Coordination between the Factors** Continuous increasing application of the variable factor alongwith fixed factors beyond a point, crosses the limit of ideal factor ratio.

This results in poor coordination between the fixed and variable factors.

4. Distinguish between

(i) Fixed Cost and Variable Cost with examples. (ii) Average Cost and Marginal Cost with examples.

Ans. (i) Difference between Fixed Cost and Variable Cost

Basis	Fixed Cost	Variable Cost
Meaning	It does not change with change in quantity of output.	It changes with change in quantity of output.
Output	It remains the same whether output is zero or maximum.	It is zero when output is zero. It increases with increase in output and decreases with decrease in output.
Examples	Rent of building, licence fee, etc.	Cost of raw material, wages of casual labour, etc.

(ii) Difference between Average Cost and Marginal Cost

Basis	Average Cost	Marginal Cost
Meaning	It is the per unit cost of output.	It is the change in Total Cost when more and more additional unit of a commodity is produced.
Formula	AC = TC/Q	$\mathbf{MC_{nth} = TC_n - TC_{n-1}}$ or $\Delta TC/\Delta \mathbf{Q}$
Example	Production of 10 units is ₹ 70, then AC = 70 ÷ 10 = ₹ 7	For producing, 4 units of a commodity costs ₹170 and 5th unit costs ₹ 200. Then, MC = 200 – 170 = ₹ 30.

5. What are the total fixed cost, total variable cost and total cost of a firm? How are they related? **(NCERT)**

Ans. **Total Fixed Cost** The cost which does not change with the change in output. Even when output is zero. In other words, fixed costs are the sum total expenditure on the purchase or hiring of fixed factors of production.

Total Variable Cost The cost which change with the change in output. In other words, variable costs are the expenditure incurred on the use of variable factors of production.

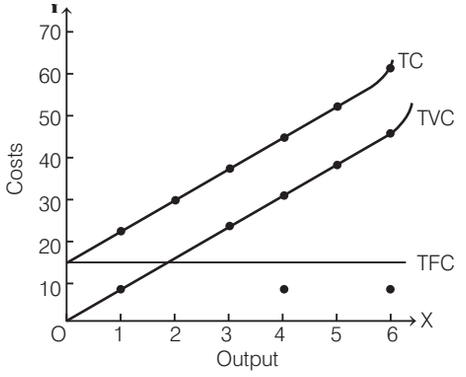
Total Cost Total cost is the sum total of total fixed cost and total variable cost at various level of output.

Relation among TFC, TVC and TC Cost Schedule Table

Output (Units)	**TFC**	**TVC**	**TC = TFC + TVC**
0	15	0	15+0=15
1	15	5	15+5=20
2	15	12	15+12=27
3	15	20	15+20=35
4	15	28	15+28=43
5	15	35	15+35=50
6	15	42	15+42=67

(i) TC = TFC + TVC. (ii) TFC is constant at all levels of output.

(iii) TVC increases as output increases. (iv) TC is parallel to TVC.



Chapter Test

Multiple Choice Questions

1. Under the relationship between TP, MP and AP curves, MP becomes negative when
(a) TP increases (b) TP decreases (c) TP remain constant (d) TP becomes zero

2. If the Average Product (AP) of a labour is 30 units of outputs, then find total product of 2 labours.
(a) 10 units of output (b) 15 units of output (c) 30 units of output (d) 60 units of output

3. If the total product of 5 labours is 50 units of output and total product of 6 labours is 66 units of output, find Average Product (AP) of 6th unit of labour.
(a) 10 units of output (b) 11 units of output (c) 50 units of output (d) 16 units of output

4. At the point of inflexion, the marginal product is ..... .
(a) increasing (b) decreasing (c) maximum (d) negative

5. Which of the stages is relevant for a firm which aims at maximum economic efficiency in the law of variable proportion?
(a) Stage I (b) Stage II (c) Stage III (d) Stage IV

6. Short-run supply curve of the firm is ..... .
(a) rising portion of MC curve (b) rising portion of MC curve which lies above AVC curve
(c) rising portion of MC curve which lies above AFC curve (d) entire MC curve

7. Cost function explain the relationship between
(a) income and expenditure (b) input and output (c) fixed cost and variable cost (d) output and cost of production

Short Answer (SA) Type Questions

1. State giving reasons, whether the following statements are true or false
(i) When there are diminishing returns to a factor, total product always decreases?
(ii) Total Product will increase only when marginal product increases.

2. Giving reasons, state whenever the following statements are true or false
(i) Average product will increase only when marginal product increases.
(ii) With increase in level of output, average fixed cost goes on falling till reaches zero.
(iii) Under diminishing returns to factor, total product continues to increase till marginal product reaches zero.

3. Complete the following table

Output (Units)	**Total Variable Cost** (TVC) (₹)	**Average Variable Cost** (AVC) (₹)	**Marginal Cost** (MC) (₹)
1	...	12	...
2	20	...	...
3	...	10	10
4	40	...	...

4. Complete the following table

Output (Units)	**Marginal Cost** (MC) (₹)	**Average Variable Cost** (AVC) (₹)	**Average Fixed Cost** (AFC) (₹)	**Average Cost** (AC) (₹)
1	...	...	...	140
2	...	45	...	...
3	45	...	30	...
4	...	48	22.5	...
5	...	52	18	...

5. Why is average revenue always equal to price?

Long Answers (LA) Type Questions

1. (i) Draw average revenue and marginal revenue curves in a single diagram of a firm which can sell more units of a good only by lowering the price of that good. Explain.

(ii) Draw a single diagram of the average revenue and marginal revenue curves of a firm which can sell any quantity of the good at a given price. Explain.

2. (i) Complete the following table

Output (Units)	**Price** (₹)	**Marginal Revenue** (₹)	**Total Revenue** (₹)
1	...	10	10
2	...	4	...
3	...	...	15
4	...	– 3	...

(ii) Complete the following table

Output (Units)	**Average Variable Cost** (AVC) (₹)	**Total Cost** (TC) (₹)	**Marginal Cost** (MC) (₹)
1	...	60	20
2	18	...	...
3	...	...	18
4	20	120	...
5	22	...	...

Answers

Multiple Choice Questions

1. *(b)* ***2.*** *(d)* ***3.*** *(b)* ***4.*** *(c)* ***5.*** *(b)* ***6.*** *(b)* ***7.*** *(d)*