Production and Costs

Standard difficulty · 20 questions · 40 marks · Time: 38 minutes

Name: _____ Date: _____ Score: ____ / 40

Write full answers in Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer 8 × 1 = 8 marks

1. The relation between inputs used and the maximum output possible is the:
   (a) demand function **(b)** budget line
   (c) cost function **(d)** production function

2. What is meant by “total product”?
   (a) output with a varying input and others fixed
   (b) input combinations giving the same output
   (c) extra cost of one more unit of output
   (d) extra output from one more unit of an input

3. Which of these is a fixed cost in the short run?
   (a) packing material **(b)** transport of finished goods
   (c) rent of the factory building **(d)** raw materials

4. With land fixed, the total product of 1 to 6 workers is 3, 10, 20, 26, 29, 29 boxes of tiles. What is the marginal product of worker 6?
   (a) 4 boxes of tiles **(b)** 29 boxes of tiles
   (c) 4.83 boxes of tiles **(d)** 0 boxes of tiles

5. The total product of 1 to 6 workers is 3, 10, 22, 32, 39, 45 units of cloth. What is the average product when 5 workers are employed?
   (a) 7 units of cloth **(b)** 39 units of cloth
   (c) 7.8 units of cloth **(d)** 9.75 units of cloth

6. A firm’s total fixed cost is ₹200; its total variable cost for 1 to 6 units is 34, 60, 98, 148, 208, 278 rupees. What is the average variable cost at 3 units?
   (a) ₹98 **(b)** ₹32.67 **(c)** ₹99.33 **(d)** ₹66.67

7. A firm’s total cost of producing 1 to 6 units is 124, 146, 180, 224, 278, 338 rupees. What is the marginal cost of unit 3?
   (a) ₹22 **(b)** ₹180 **(c)** ₹60 **(d)** ₹34

8. When a firm triples all its inputs, output goes from 270 to 780 units. This shows:
   (a) decreasing returns to scale **(b)** increasing returns to scale
   (c) constant returns to scale **(d)** the law of demand

Section B — Short answer — 8 × 2 = 16 marks

9. Distinguish between the short run and the long run in production.

10. Fixed or variable cost? (a) transport of finished goods (b) interest on a loan for machines

11. Explain each term: (a) returns to scale (b) total product

12. The marginal product of 1 to 6 workers on a fixed plot is 5, 7, 9, 7, 3, 0 quintals of rice. Find the total product for each. After which worker does the marginal product start to fall?

13. The total product of 1 to 6 workers is 5, 15, 30, 41, 51, 58 boxes of tiles. Find the average product at 2 and at 3 workers.

14. A firm's TFC is ₹170 and its marginal cost of units 1 to 6 is 36, 28, 24, 34, 44, 48 rupees. Find the TVC and TC of each output.

15. A firm's TFC is ₹180 and its TVC at 2 units is ₹56. Find TC, AFC, AVC and AC at 2 units.

16. A firm triples both labour and capital, and output rises from 230 to 700. What kind of returns to scale is this? Explain.

Section C — Longer answers — 4 × 4 = 16 marks

17. Explain the shapes of the TP, AP and MP curves.

18. Match each with its meaning: (a) short run (b) total product (c) marginal cost. Choose from: output with a varying input and others fixed; extra cost of one more unit of output; a period when some inputs are fixed.

19. On a fixed plot, the total product of 1 to 6 workers is 5, 13, 24, 31, 36, 38 boxes of tiles. (a) Find MP and AP for each worker. (b) Where does MP start falling? (c) Which law does this show?

20. A firm's TFC is ₹80 and its TVC for 1 to 6 units is 24, 40, 48, 62, 88, 120 rupees. (a) Find AVC and AC for each output. (b) Find MC for each unit. (c) What happens to the gap between AC and AVC, and why?

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Answer key

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Q	Answer	Working
1	**(d) production function**	—
2	**(a) output with a varying input and others fixed**	—
3	**(c) rent of the factory building**	—
4	**(d) 0 boxes of tiles**	29 − 29
5	**(c) 7.8 units of cloth**	39 ÷ 5
6	**(b) ₹32.67**	98 ÷ 3
7	**(d) ₹34**	180 − 146
8	**(a) decreasing returns to scale**	3 × 270 = 810, compared with 780
9	**In the short run some inputs are fixed; in the long run all inputs can be varied.**	—
10	**(a) variable (b) fixed**	—
11	**(a) output change when all inputs rise in proportion (b) output with a varying input and others fixed**	—
12	**5, 12, 21, 28, 31, 31; it falls after worker 3**	TP = sum of MPs so far
13	**7.5 and 10**	15 ÷ 2; 30 ÷ 3
14	**TVC 36, 64, 88, 122, 166, 214; TC 206, 234, 258, 292, 336, 384**	TVC = sum of MCs; TC = TVC + TFC
15	**TC ₹236, AFC ₹90, AVC ₹28, AC ₹118**	TC = 180 + 56; each ÷ 2
16	**increasing returns to scale: output became 3.04 times, against inputs 3 times**	700 ÷ 230 = 3.04
17	**TP rises first at an increasing rate and then at a decreasing rate; MP and AP are inverse U-shaped, and MP cuts AP at the maximum of AP.**	—
18	**(a) a period when some inputs are fixed (b) output with a varying input and others fixed (c) extra cost of one more unit of output**	—
19	**(a) MP 5, 8, 11, 7, 5, 2; AP 5, 6.5, 8, 7.75, 7.2, 6.33 (b) after worker 3 (c) the law of variable proportions (diminishing marginal product)**	MP = change in TP; AP = TP ÷ workers
20	**(a) AVC 24, 20, 16, 15.5, 17.6, 20; AC 104, 60, 42.67, 35.5, 33.6, 33.33 (b) MC**	AVC = TVC ÷ q; AC = (TFC + TVC) ÷ q; MC = change in TVC

Q	Answer	Working
	24, 16, 8, 14, 26, 32 (c) it narrows, because the gap is AFC, which falls as output rises	