

Microeconomics, Module 6: "Production and Costs" (Chapter 6)

Illustrative Test Questions

(The attached PDF file has better formatting.)

Question 6.1: Factors of Production

If the firm can adjust its use of some but not all factors of production, then

- A. The firm is in the short run.
- B. The firm can increase profits by shifting fixed costs to variable costs.
- C. The firm can increase profits by shifting variable costs to fixed costs.
- D. The firm cannot change its level of output.
- E. The firm is not earning optimal profits.

Answer 6.1: A

The long run is defined as the period needed to adjust *all* factors of production. We do not know if the firm can increase profits by shifting fixed costs to variable costs or the reverse.

Question 6.2: Total Product of Labor

Which of the following would cause the total product of labor curve to shift upward?

- A. An increase in the labor employed.
- B. An increase in the capital employed.
- C. An increase in the wage rate.
- D. An increase in the rental rate.
- E. An increase in the cost of capital.

Answer 6.2: B

Capital deepening, or an increase in the capital available per worker, increases the marginal product and total product of labor.

Illustration: Suppose farmland is used to produce grain.

- One worker, cultivating the best land, can produce 20 bushels.
- A second worker, cultivating the next best land, can produce 18 bushels.

If we add capital to buy a better tractor, the first worker can produce 30 bushels and the second worker can produce 25 bushels.

Question 6.3: Marginal Cost Curve

The short run marginal cost curve becomes upward sloping because of

- A. Rising input prices.
- B. Diminishing marginal returns to labor.
- C. Decreasing returns to scale.
- D. A diminishing marginal rate of technical substitution of labor for capital.
- E. Diminishing marginal utility of the goods produced.

Answer 6.3: B

In the short run, labor is variable but capital is fixed. As more workers use the limited supply of capital, their short run marginal output reduces and their marginal cost increases.

Item C: Returns to scale refer to the effects of proportionately increasing all factors of production in the long-run.

Question 6.4: Marginal Product

When labor's marginal product is greater than its average product, the firm

- A. Is experiencing decreasing returns to scale.
- B. Is beyond the point of diminishing marginal returns.
- C. Is in the first stage of production.
- D. Is in the second stage of production.
- E. Could increase profits by reducing its labor and substituting capital.

Answer 6.4: C

Question 6.5: Cost Curves

Assume capital is fixed and labor is variable in the short run. If the wage rate paid to labor rises, which of the following short run cost curves will shift upward?

- A. The average cost curve, but not the average variable cost or marginal cost curves.
- B. The average variable cost curve, but not the average cost or marginal cost curves.
- C. The marginal cost curve, but not the average cost or average variable cost curves.
- D. The marginal, average, and average variable cost curves all shift upward.
- E. The average cost and average variable cost curves, but not the marginal cost curve.

Answer 6.5: D

Labor costs are variable costs, so they increase marginal, variable, and total costs.

Question 6.6: Isoquant Diagram

In an isoquant diagram, where are technologically inefficient ways of producing one unit of output located?

- A. On the expansion path.
- B. On the unit isoquant.
- C. To the southwest of the unit isoquant.
- D. To the northeast of the unit isoquant.
- E. Only technologically efficient points are on the isoquant diagram.

Answer 6.6: D

The unit isoquant is the technologically efficient ways of producing one unit (item B), where labor is on the horizontal axis and capital is on the vertical axis. To the northeast of the unit isoquant are combinations of labor and capital that are more than need (inefficient); to the southwest are combinations of labor and capital that are insufficient (items C and D). The expansion path (item A) is determined by the tangency of isocosts with isoquants.

Question 6.7: Relative Hours

Suppose the marginal product of labor is 3 units of output per hour of labor and the marginal product of capital is 12 units of output per hour of capital. How many hours of capital does it take to replace 1 hour of labor without affecting the firm's output?

- A. 0.111 hours of capital.
- B. 0.25 hours of capital.
- C. 1 hour of capital.
- D. 3 hours of capital.
- E. 4 hours of capital.

Answer 6.7: B

One hour of labor produces 3 units. Since 1 hour of capital produces 12 units, 0.25 hours of capital produces 3 units.

Question 6.8: Expansion Path

The expansion path shows the combinations of labor and output that

- A. Determine the firm's short run costs.
- B. Are technologically efficient methods of producing one unit of output.
- C. Provide the firm with its maximum long run profit.
- D. Are cost-efficient in the long run.
- E. Are cost-efficient in the short run.

Answer 6.8: D

In the short run, the firm can not change its use of capital; the expansion path refers to the long run (items A and E).

Item B is the unit isoquant. For item C, we must also know the marginal revenue curve.

Question 6.9: Marginal Products

A firm is currently producing 3,000 units of output using 150 hours of labor and 50 hours of capital. The marginal product of labor is 10 units of output per hour, and the marginal product of capital is 30 units of output per hour. If the wage rate is \$5 per hour and the rental rate is \$10 per hour, then

- A. The firm's use of labor and capital is cost-efficient.
- B. The firm can produce more output for the same total cost by using more labor and more capital.
- C. The firm can produce more output for the same total cost by using more labor and less capital.
- D. The firm can produce more output for the same total cost by using less labor and more capital.
- E. The elasticity of labor is greater than the elasticity of capital.

Answer 6.9: D

The firm can use 2 fewer hours of labor and one more hour of capital with no change in total cost. The change in output is $-2 \times 10 + 1 \times 30 = +10$.

Question 6.10: Expansion Path

Assume that labor is on the horizontal axis and capital is on the vertical axis in the isoquant-isocost diagram. If the wage rate paid to labor rises, then the expansion path will

- A. Shift up.
- B. Shift down.
- C. Shift up if the marginal product of labor exceeds the marginal product of capital; otherwise shift down.
- D. Shift up if the marginal product of capital exceeds the marginal product of labor; otherwise shift down.
- E. Not change.

Answer 6.10: A

The wage rate does not affect the isoquants. If the wage rate rises, the isocosts become steeper, and the tangency points of the isocosts with the isoquants moves upward.

Question 6.11: Long Run Average Cost Curve

Assuming input prices are fixed, a downward sloping long run average cost curve indicates that the firm is experiencing

- A. Increasing returns to scale.
- B. Diminishing marginal returns to labor.
- C. Increasing marginal returns to labor.
- D. Diminishing marginal returns to capital.
- E. Increasing marginal returns to capital.

Answer 6.11: A

The downward sloping long-run average cost curve means that as output increases, the average cost decreases. Input prices are fixed, so the prices of the raw materials is not changing. Rather, as output increases, there are more efficient methods of production.

Illustration: Suppose Jacob and Rachel run a copy shop.

- If their demand is for 1,000 copies a day, they buy a small copy machine, and their costs are 10¢ a copy.
- If their demand is for 100,000 copies a day, they buy a large copy machine, and their costs are 5¢ a copy.