

Name _____

Group _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Use the following two statements to answer this question: 1) _____
I. Production functions describe what is technically feasible when the firm operates efficiently.
II. The production function shows the least cost method of producing a given level of output.
A) Both I and II are false. B) Both I and II are true.
C) I is true, and II is false. D) I is false, and II is true.
- 2) Which of the following inputs are variable in the long run? 2) _____
A) plant size. B) labor.
C) capital and equipment. D) all of these.
- 3) A production function assumes a given 3) _____
A) amount of output.
B) amount of capital and labor.
C) set of input prices.
D) technology.
E) ratio of input prices.
- 4) A function that indicates the maximum output per unit of time that a firm can produce, for every combination of inputs with a given technology, is called 4) _____
A) a production possibility curve. B) an isocost function.
C) a production function. D) an isoquant.

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

- 5) Wally describes himself as a resilient fundamentalist when it comes to making investments in the stock market. At the moment, Wally uses only periodicals from the library when analyzing corporate fundamentals. The number of firms he can analyze in a day is given by the function: $y(L) = 2\sqrt{L}$, where L is the number of hours a day he works. Sketch Wally's total number of firms analyzed as he increases his hours of work. If Wally begins using internet sources to learn about corporate fundamentals, the number of firms he can analyze in a day is given by the function: $y(L) = 5\sqrt{L}$ Sketch Wally's total number of firms analyzed as he increases his hours of work and uses the internet.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 6) If the law of diminishing returns applies to labor then 6) _____
- A) the average product of labor must eventually become negative
 - B) the marginal product of labor must rise and then fall as employment rises
 - C) the marginal product of labor must eventually become negative
 - D) after some level of employment, the marginal product of labor must fall
 - E) the average product of labor must rise and then fall as employment increases
- 7) Consider the following statements when answering this question; 7) _____
- I. Whenever the marginal product of labor curve is a downward sloping curve, the average product of labor curve is also a downward sloping curve that lies above the marginal product of labor curve.
 - II. If a firm uses only labor to produce, and the production function is given by a straight line, then the marginal product of labor always equals the average product of labor as labor employment expands.
- A) I is false, and II is true.
 - B) Both I and II are false.
 - C) Both I and II are true.
 - D) I is true, and II is false.
- 8) The law of diminishing returns applies to 8) _____
- A) both the short and the long run.
 - B) the short run only.
 - C) neither the short nor the long run.
 - D) the long run only.
 - E) all inputs, with no reference to the time period.

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

- 9) Sarah's Pretzel Plant produces pretzels according to the function $y(K, L) = 1,000\sqrt{K}\sqrt[3]{L}$. K is the number of ovens, and L is the number of labor hours Sarah uses to produce her pretzels. At the moment, Sarah uses 9 ovens. Also, she plans to hire 64 labor hours. Sarah can sell each unit of pretzels produced for \$3.50. Fill in the table below. If Sarah increased her use of labor hours to 65, would the value of the marginal product of labor exceed the wage rate of \$8.50?

| $y(9, L)$ | L | $MP_L = \frac{1,000}{L^{2/3}}$ | $\$3.50 * MP_L$ |
|-----------|-----|--------------------------------|-----------------|
| | 64 | | |
| | 65 | | |

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 10) Which would not increase the productivity of labor? 10) _____
- A) An increase in technology.
 - B) An increase in the efficiency of energy.
 - C) An increase in the size of the labor force.
 - D) An increase in the quantity of capital.
 - E) An increase in the quality of capital.
- 11) Marginal product crosses the horizontal axis (is equal to zero) at the point where 11) _____
- A) diminishing returns set in.
 - B) average product is maximized.
 - C) total product is maximized.
 - D) output per worker reaches a maximum.
 - E) all of the above are true.
- 12) At a given level of labor employment, knowing the difference between the average product of labor and the marginal product of labor tells you 12) _____
- A) whether increasing labor use changes the marginal product of labor
 - B) whether increasing labor use raises output
 - C) whether economies of scale exist
 - D) how increasing labor use alters the average product of labor
 - E) whether the law of diminishing returns applies
- 13) The Malthusian dilemma relates to marginal product in that 13) _____
- A) because of diminishing marginal product, the amount of food produced by each additional member of the population increases.
 - B) starvation can be averted only if marginal product is constant.
 - C) because of diminishing marginal product, the amount of food produced by each additional member of the population decreases.
 - D) because of diminishing average product, the population will not have additional capital to work with.
 - E) because of diminishing marginal product, the wage falls as the population decreases.
- 14) Technological improvement 14) _____
- A) allows more output to be produced with the same combination of inputs.
 - B) can hide the presence of diminishing returns.
 - C) can be shown as a shift in the total product curve.
 - D) All of the above are true.

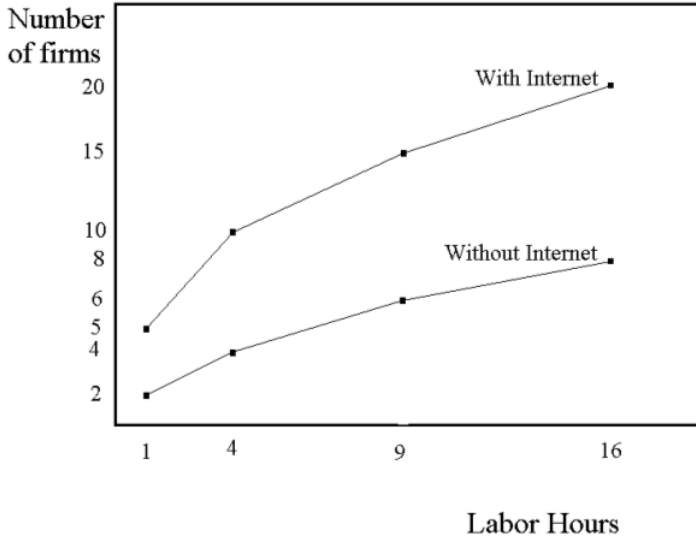
- 15) When labor usage is at 12 units, output is 36 units. From this we may infer that 15) _____
 A) the average product of labor is 3. B) the total product of labor is 1/3.
 C) the marginal product of labor is 3. D) none of the above.
- 16) The rate at which one input can be reduced per additional unit of the other input, while holding output constant, is measured by the 16) _____
 A) marginal rate of substitution. B) average product of the input.
 C) slope of the isocost curve. D) marginal rate of technical substitution.
- 17) A firm's marginal product of labor is 4 and its marginal product of capital is 5. If the firm adds one unit of labor, but does not want its output quantity to change, the firm should 17) _____
 A) use 0.8 fewer units of capital. B) use five fewer units of capital.
 C) use 1.25 fewer units of capital. D) add 1.25 units of capital.
- 18) A production function in which the inputs are perfectly substitutable would have isoquants that are 18) _____
 A) linear. B) concave to the origin.
 C) L-shaped. D) convex to the origin.
- 19) An isoquant 19) _____
 A) cannot have a negative slope.
 B) is a curve that shows all the combinations of inputs that yield the same total output.
 C) is a curve that shows all possible output levels that can be produced at the same cost.
 D) is a curve that shows the maximum total output as a function of the level of labor input.
 E) must be linear.
- 20) If we take the production function and hold the level of output constant, allowing the amounts of capital and labor to vary, the curve that is traced out is called: 20) _____
 A) the total product.
 B) the average product.
 C) the marginal product.
 D) an isoquant.
 E) none of the above.

- 21) Which of the following is NOT related to the slope of isoquants? 21) _____
- A) The fact that there are diminishing returns to inputs.
 - B) The fact that input prices are positive.
 - C) The fact that more of either input increases output.
 - D) The fact that inputs have diminishing marginal product.
 - E) The fact that inputs have positive marginal product.
- 22) A firm uses two factors of production. Irrespective of how much of each factor is used, both factors always have positive marginal products which imply that 22) _____
- A) isoquants are relevant only in the long run
 - B) isoquants can become vertical or horizontal
 - C) isoquants have negative slope
 - D) isoquants are convex
 - E) none of the above
- 23) The function which shows combinations of inputs that yield the same output is called a(n) 23) _____
- A) production possibilities frontier.
 - B) isoquant curve.
 - C) isocost curve.
 - D) production function.
- 24) The marginal rate of technical substitution is equal to the 24) _____
- A) change in output divided by the change in labor.
 - B) slope of the total product curve.
 - C) change in output minus the change in labor.
 - D) ratio of the marginal products of the inputs.
- 25) A straight-line isoquant 25) _____
- A) is impossible.
 - B) would indicate that the firm could not switch from one output to another.
 - C) would indicate that the firm could switch from one output to another costlessly.
 - D) would indicate that capital and labor are perfect substitutes in production.
 - E) would indicate that capital and labor cannot be substituted for each other in production.

Answer Key

Testname: TEST 1 - PRODUCTION

- 1) C
- 2) D
- 3) D
- 4) C
- 5)



- 6) D
- 7) A
- 8) B
- 9)

| $y(9, L)$ | L | $MP_L = \frac{1,000}{L^{2/3}}$ | $\$3.50 * MP_L$ |
|-----------|----|--------------------------------|-----------------|
| 12,000 | 64 | 62.5 | \$218.75 |
| 12,062.18 | 65 | 61.88 | \$216.50 |

If Sarah uses 65 hours of labor, the value of the marginal product of the 65th labor hour exceeds the \$8.50 cost of labor. This suggests that if Sarah goes beyond 64 units of labor hours, her profits will be higher.

- 10) C
- 11) C
- 12) D
- 13) C
- 14) D
- 15) A
- 16) D
- 17) A
- 18) A
- 19) B
- 20) D
- 21) B
- 22) C
- 23) B
- 24) D
- 25) D