Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Econ 301

**Exam 03**

* There are 110 possible points on this exam. The test is out of 100.
* You have one hour to complete this exam, but you should be able to complete it in less than that
* Please turn off all cell phones and other electronic equipment.
* You are allowed a calculator for the exam. This calculator cannot be capable of storing equations. This calculator cannot double as a cell phone.
* Be sure to read all instructions and questions carefully.
* Remember to show all your work.
* Recall basic logic. “Water is wet” is a true statement. “Water is wet and leopards have stripes” is a false statement.
* *Please print clearly and neatly.*

**Part I: Multiple Choice.** *Choose the best answer to the following.*

5 points each.

1. What is the difference between the short run and the long run?
   1. In the long run, all variable costs are fixed
   2. In the short run, there is at least one fixed cost
   3. In the short run, marginal cost is greater than average total cost
   4. A & C
   5. None of the above
2. When are there decreasing marginal returns to labor?
3. When the marginal cost of labor is greater than the marginal benefit of labor.
4. When the marginal product of labor is positive and downward sloping.
5. When the marginal product of labor is negative and downward sloping.
6. B & C
7. None of the above
8. If the MRTS is 6 when there is a change in labor of 3, what must be the change in capital?
   1. -18
   2. -0.5
   3. 2
   4. 12
   5. None of the above
9. Which of the following is the same thing as the MRTS?
   1. MPL times the change in labor
   2. MPL divided by MPK
   3. MPL times the change in capital
   4. A & C
   5. None of the above
10. What does the short-run expansion path look like?
    1. An upward sloping curve, with its slope depending on the returns to scale.
    2. A downward sloping curve, with its slope depending on the economies of scale.
    3. A curve which may be upward or downward sloping, fluctuating depending on if there are returns to scale or not.
    4. A curve which may be upward or downward sloping, fluctuating depending on if there are economies of scale or not.
    5. None of the above
11. Which of the following explains the shape of an isoquant?
12. Opportunity cost
13. Diminishing marginal returns
14. Substitution
15. B & C
16. None of the above
17. When we amortize capital, what do we do?
18. Calculate how much it depreciates each period.
19. Determine the user cost of capital.
20. Spread an initial payment over a life span.
21. A & C
22. None of the above
23. If “bacon” is on the X-axis and “ham” is on the Y-axis, what does the product transformation curve look like?
24. Convex
25. Downward sloping
26. Concave
27. B & C
28. None of the above
29. A long-run average cost curve is different from a short-run average cost curve because, unlike a short-run average cost curve, a long-run average cost curve:
    1. Is convex
    2. Is bisected by a marginal cost curve
    3. Envelopes other curves
    4. A & C
    5. None of the above
30. Which of the following is an example of emergent order?
    1. Who dates who
    2. A construction company building a house
    3. What goes on an exam
    4. A & B
    5. None of the above

**Part II: True/False.** *Answer true or false and justify your answer.*

points each.

1. Having economies of scale is the same thing as having returns to scale.

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1. According to F.A. Hayek, one of the main advantages of prices is that they embody local knowledge.

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1. If alpha is 0.4 and beta is 0.4 in a Cobbs-Douglas production function, then this production function has increasing returns to scale.

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**Part III: Short Answer.** *Answer the following.*

15 points each.

1. Consider the following cost function: Q = 4K0.25L0.75; the following prices: r = 3 and w = 1; and you wish to make 100 units. Using a Lagrangian, calculate how much of K and L will minimize the costs of production. Remember to show all your work.
2. Use the following isoquants, construct an isocost curve with a cost of 36, price of labor is 2, the price of capital is 6. Indicate the quantities the firm will buy. Then, in the following diagram, suppose advances in robotics and artificial intelligence makes capital and labor perfect substitutes, where one unit of capital does the same work as five units of labor. Using this information and assuming prices and the total cost stays the same, indicate how much capital and labor the firm buys by constructing isoquants and an isocost curve.

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K

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