Monmouth COLLEGE

- Name: _____
- Date: _____
- Section: _____

ECON 300: Intermediate Price Theory

Quiz #5

Fall 2024

INSTRUCTIONS:

- Please read all questions carefully before you begin answering.
- Answer all questions in the spaces provided on the question sheet.
- This quiz consists of 5 pages, including this one. There are a total of 4 problems with a total of 16 subquestions.
- This is a closed-book quiz. Please remove all materials from the top of the desk and take any necessary items from your bags before the exam begins.

Problem 1. Definitions **(5 Points Each)**

Select FOUR items on the list of items below, and provide a definition of the items that you chose.

- Constant Returns to Scale
- Marginal Cost
- Isoquant
- Marginal Rate of Technical Substitution
- Technological Progress
- Isocost

1.A. Item #1: _____

1.B. Item #2: _____

1.C. Item #3: _____

1.D. Item #4: _____

Problem 2. True / False **(5 Points Each)**

Determine whether the following statements are either `TRUE` or `FALSE`. If you deem that the statement is `TRUE`, there is no need to justify your answer. If you deem that the statement is `FALSE`, you MUST justify your verdict by providing an explanation.

2.A. The short run refers to a time frame in which all factors of production are variable.

2.B. If a producer's production function has evolved from $F(L, K) = 2LK$ to $G(L, K) = 3LK$, we can conclude that technological progress has occurred.

2.C. Assume that L and K are the only factors of production. If a producer is employing $L = 10$ units of labor at a wage of $w = 2$, and $K = 20$ units of capital at a rent of $r = 5$, and producing $Q = 20$ units of total output, the average total cost of production is $ATC(Q) = 5$.

2.D. A producer operating in a perfectly competitive market should always maintain their production process such that their marginal revenue is strictly greater than their marginal cost of production; $MR(Q) > MC(Q)$.

Problem 3. Cost Minimization **(7.5 Points Each)**

Suppose that a firm is producing output Q using two factors of production, labor L and capital K. The firm's production technology can be represented by the following production function:

$$F(L, K) = 2L^2K$$

Suppose further that wages are given as $w = 24$ and rent is given as $r = 12$.

3.A. Find the marginal product of labor and capital, respectively.

- $MP_L =$
- $MP_K =$

3.B. Assuming $MU_L = 2K$ and $MP_K = L$, find the expression for this producer's marginal rate of technical substitution between labor and capital.

- $MRTS_{LK} =$

3.C. What is the optimal ratio of labor to capital that the producer should maintain?

3.D. If the producer's target output is $Q = 2,000$ what is the cost-minimizing total cost of production?

Problem 4. Profit Maximization **(7.5 Points Each)**

Suppose that a producer is operating in a perfectly competitive market where the market price of the output is given as $P = 100$, and has the following cost function:

$$TC(Q) = 250 + 20Q + Q^2$$

4.A. Find the producer's total revenue function $TR(Q)$.

- $TR(Q) =$

4.B. Find the producer's marginal revenue function $MR(Q)$.

- $MR(Q) =$

4.C. Find the producer's marginal cost function $MC(Q)$.

- $MC(Q) =$

4.D. Find the profit maximizing quantity that the producer should produce.

- Original Score: _____
- Recovered Score: _____
- Original Date: _____
- Recovered Date: _____