

Please Do Not Turn This Page Until Instructed to Do So!

ECON 217

(Prof. Nader Kabbani)

Final Exam – Fall 2005-2006

Student's Name: _____

I.D. Number: _____

Instructions – Please Read Carefully!

1. Please write legibly (if I can't read it, I can't grade it.)
2. Please use only blue or black ink; do not use a pencil.
3. Please check that your exam has 11 pages (including this cover page).
4. You may use the margins and backs of pages; but make sure that I can follow your work.
5. Use of programmable calculators and cell phones is strictly forbidden.
6. There are 30 multiple choice questions (2 points each) and 2 problems (20 points each).
7. Read exam questions carefully. **Don't spend too much time on any one question.**
8. Partial credit can be given, so be sure to show all your work.
9. If you think that you found a mistake, comment on it. You may receive extra credit.
10. Check the blackboard periodically. I will post corrections and clarifications there.
11. Keep your eyes on your exam: If I see a student looking at another's exam, I will assume s/he is copying. I will immediately take away their exam and give them a failing grade.

You have 120 minutes to complete the exam.

Good luck!

Multiple Choice Questions: (2 Points Each – 60 Points Total)
No Penalty for Wrong Answers

Please Select the BEST Answer for Each the Following Questions or Statements.

If a firm moves from one point on a production isoquant to another point on the same isoquant, which of the following will certainly not happen?

- A change in the level of output
- A change in the ratio in which the inputs are combined
- A change in the marginal products of the inputs
- A change in the rate of technical substitution
- A change in profitability

The UJava espresso stand needs two inputs, labor and coffee beans, to produce espresso. Producing an espresso always requires the same amount of coffee beans and the same amount of time. Which of the following production functions would appropriately describe the production process at UJava, where B represents ounces of coffee beans, and L represents hours of labor?

- $Q = B^{0.60} L^{0.40}$.
- $Q = B/2 + L/30$.
- $Q = \min(2B, 60L)$.
- $Q = 0.5B + 0.5L^{0.5}$.
- None of the above.

A competitive firm's short-run production function is $q = 305x - 2x^2$, where x is the amount of variable factor used. The price of the output is \$2 per unit and the price of the variable factor is \$10 per unit. In the short run, how many units of x should the firm use?

- 37
- 150
- 21
- 75
- None of the above.

The production function is given by $f(x) = 4x^{1/2}$. If the price of the commodity produced is \$60 per unit and the cost of the input is \$20 per unit, how much profits will the firm make if it maximizes profits?

- \$1,444
- \$705
- \$720
- \$358
- \$363

When Farmer Green applies N pounds of fertilizer per acre, the marginal product of fertilizer is $1 - N/200$ bushels of corn. If the price of corn is \$4 per bushel and the price of fertilizer is \$1.20 per pound, then how many pounds of fertilizer per acre should Farmer Green use in order to maximize his profits?

- a. 140
- b. 280
- c. 74
- d. 288
- e. 200

Philip owns and operates a gas station. Philip works 40 hours a week managing the station but doesn't draw a salary. He could earn \$700 a week doing the same work for Tony. The station owes the bank \$100,000 and Philip has invested \$100,000 of his own money. If Philip's accounting profits are \$1,000 per week while the interest on his bank debt is \$400 per week, the business's economic profits are

- a. \$0 per week.
- b. -\$100 per week.
- c. \$600 per week.
- d. \$300 per week.
- e. \$1,000 per week.

A firm has fixed costs of \$4,000. Its short-run production function is $y = 4x^{1/2}$, where x is the amount of variable factor it uses. The price of the variable factor is \$4,000 per unit. If y is the amount of output, the short-run total cost function is

- a. $4,000/y + 4,000$.
- b. $8,000y$.
- c. $4,000 + 4,000y$.
- d. $4,000 + 250y^2$.
- e. $4,000y + 0.25y^2$.

As assistant vice president in charge of production for a computer firm, you are asked to calculate the cost of producing 170 computers. The production function is $q = \min \{x, y\}$ where x and y are the amounts of two factors used. The price of x is \$18 and the price of y is \$10. What is your answer?

- a. \$2,580
- b. \$4,760
- c. \$8,460
- d. \$6,180
- e. None of the above.

Nadine has a production function $4x_1 + x_2$. If the factor prices are \$12 for factor 1 and \$2 for factor 2, how much will it cost her to produce 30 units of output?

- a. \$795
- b. \$60
- c. \$90
- d. \$1,500
- e. \$75

A competitive firm uses two inputs, x and y . Total output is the square root of x times the square root of y . The price of x is \$17 and the price of y is \$11. The company minimizes its costs per unit of output and spends \$517 on x . How much does it spend on y ?

- a. \$766
- b. \$480
- c. \$655
- d. \$517
- e. None of the above.

If the production function is given by $f(x_1, x_2, x_3, x_4) = \min\{x_1, x_2\} + \min\{x_3, x_4\}$ and the prices of inputs (x_1, x_2, x_3, x_4) are $(2, 1, 5, 3)$, the minimum cost of producing 1 unit of output is closest to

- a. \$1.
- b. \$3.
- c. \$4.
- d. \$8.
- e. \$11.

If it costs \$20 to set up and later clean a bagel press and bagels cost \$1 per week per bagel to store, how many times should the bagel press be run each week to produce 360 bagels a week to be sold continuously?

- a. Twice
- b. 4 times
- c. Once
- d. 3 times
- e. 5 times

The marginal cost curve of a firm is $MC = 6y$. Total variable costs to produce 10 units of output are

- a. \$120.
- b. \$300.
- c. \$80.
- d. \$400.
- e. \$26.

The following relationship must hold between the average total cost (ATC) curve and the marginal cost curve (MC):

- a. If MC is rising, ATC must be rising.
- b. If MC is rising, ATC must be greater than MC.
- c. If MC is rising, ATC must be less than MC.
- d. If ATC is rising, MC must be greater than ATC.
- e. If ATC is rising, MC must be less than ATC.

A firm has the production function $Q = X_1^{1/2} X_2$. In the short run it must use exactly 35 units of factor 2. The price of factor 1 is \$105 per unit and the price of factor 2 is \$3 per unit. The firm's short-run marginal cost function is

- a. $MC(Q) = 105Q^{-1/2}$.
- b. $MC(Q) = 6Q/35$.
- c. $MC(Q) = 105 + 105Q^2$.
- d. $MC(Q) = 3Q$.
- e. $MC(Q) = 35Q^{-1/2}$.

In the reclining chair industry (which is perfectly competitive), two different technologies of production exist. These technologies exhibit the following total cost functions:

$$C1(Q) = 500 + 560Q - 40Q^2 + Q^3$$

$$C2(Q) = 600 + 280Q - 20Q^2 + Q^3$$

Due to foreign competition, the market price of reclining chairs has fallen to \$170. In the short run, firms using technology 1

- a. and firms using technology 2 will remain in business.
- b. will remain in business and firms using technology 2 will shut down.
- c. will shut down and firms using technology 2 will remain in business.
- d. and firms using technology 2 will shut down.
- e. More information is needed to make a judgment.

A profit maximizing firm continues to operate even though it is losing money. It sells its product at a price of \$100. From these facts we deduce that:

- a. average total cost is less than \$100.
- b. average fixed cost is less than \$100.
- c. marginal cost is increasing.
- d. average variable cost is less than \$100.
- e. marginal cost is decreasing.

A competitive firm has a single factory with the cost function $c(y)=4y^2+89$ and produces 28 units in order to maximize profits. Although the price of output does not change, the firm decides to build a second factory with the cost function $c(y)=8y^2+39$. To maximize its profits, how many units should it produce in the second factory?

- a. 14
- b. 21
- c. 9
- d. 13
- e. None of the above.

A competitive firm is choosing an output level to maximize its profits in the short run. Which of the following is not necessarily true? (Assume that marginal cost is not constant and is well-defined at all levels of output.)

- a. Marginal cost is at least as large as average variable cost.
- b. Total revenues are at least as large as total costs.
- c. Price is at least as large as average variable cost.
- d. Price equals marginal cost.
- e. The marginal cost curve is rising.

A competitive industry has 10,000 identical firms. For each firm in the industry, the long run cost of producing y units of output is $c(y)=\$100+y^2$ if $y>0$ and $c(0)=0$. The government imposes a lump sum tax of \$300 on each firm in the industry. Firms can avoid this tax only by going out of business.

There is free entry and exit into this industry. In the long run:

- a. the number of firms stays constant and the price of output rises by \$30.
- b. the number of firms doubles and the price of output doubles.
- c. the number of firms is halved and the price of output is doubled.
- d. the number of firms stays constant and the price of output rises by less than \$30.
- e. None of the above.

In Argentina, cattle can be produced according to the following process:

$C=(G/10) + (P/30)$ where C is the number of cattle, G are bushels of grain, and P are acres of pasture. If grain costs \$5 per bushel, and pasture costs \$4 per acre, how many cattle can a rancher produce with a budget of \$9,000?

- a. 1,800
- b. 225
- c. 180
- d. 75
- e. 900

A monopolist faces the inverse demand function described by $p=32-5q$ where q is output. The monopolist has no fixed cost and his marginal cost is 7 at all levels of output. Which of the following expresses the monopolist's profits as a function of his output?

- a. $32-5q-7$
- b. $32-10q$
- c. $25q-5q^2$
- d. $32q-5q^2-7$
- e. None of the above.

The demand for a monopolist's output is $2,000/(p+1)^2$ where p is the price she charges. At a price of 3, the elasticity of demand for the monopolist's output is:

- a. -1.
- b. -2.50.
- c. -1.50.
- d. -2.
- e. -1.

A monopolist has constant marginal costs of \$1 per unit. The demand for her output is $1000/p$ if p is less than or equal to 50. The demand is 0 if $p>50$.

What is her profit maximizing level of output?

- a. 5
- b. 10
- c. 15
- d. 20
- e. 25

A monopolist has decreasing average costs as output increases. If the monopolist sets price equal to average cost, it will:

- a. produce too much output from the standpoint of efficiency.
- b. lose money.
- c. produce too little output from the standpoint of efficiency.
- d. maximize its profits.
- e. face excess demand.

An airline has exclusive landing rights at the local airport. The airline flies one flight per day to New York with a plane that has a seating capacity of 100.

The cost of flying the plane per day is $\$4,000 + 10q$ where q is the number of passengers. The number of flights to New York demanded is $q=165-.5p$. If the airline maximizes its monopoly profits, the difference between the marginal cost of flying an extra passenger and the amount the marginal passenger is willing to pay to fly to New York is:

- a. \$10.
- b. \$100.
- c. \$140.
- d. \$160.
- e. None of the above.

A monopolist faces a downward-sloping demand curve and has fixed costs so large that when he maximizes profits with a positive amount of output, he earns exactly zero profits. At this positive, profit-maximizing output, it must be that:

- a. there are decreasing returns to scale.
- b. demand is price inelastic.
- c. marginal revenue is greater than marginal cost.
- d. price equals marginal cost.
- e. average total cost is greater than marginal cost.

In a market with inverse demand curve $P=10-Q$, Brand X is a monopolist with no fixed costs and with a marginal cost of 2. If marginal cost rises to 4, by how much will the price of Brand X rise?

- a. 2
- b. 1
- c. 3
- d. No change, the firm is already charging the monopoly price.
- e. None of the above.

A profit-maximizing monopolist faces a demand function given by $q=1000-20p$ where p is the price of her output in dollars. She has a constant marginal cost of 20 dollars per unit of output. In an effort to induce her to increase her output, the government agrees to pay her a subsidy of 10 dollars for every unit that she produces. In response to the subsidy, she will:

- a. increase her price and lower her output.
- b. decrease her price by \$5 per unit.
- c. decrease her price by \$10 per unit.
- d. decrease her price by more than \$10 per unit, but by less than \$16 per unit.
- e. decrease her price by more than \$16 per unit.

A monopolist sells in two markets. The demand curve for her product is given by $p_1=119-2x_1$ in the first market and $p_2=123-5x_2$ in the second market, where x_i is the quantity sold in Market i and p_i is the price charged in Market i . She has a constant marginal cost of production, $c=3$, and no fixed costs. She can charge different prices in the two markets. What is the profit-maximizing combination of quantities for this monopolist?

- a. $x_1=58$ and $x_2=14$
- b. $x_1=29$ and $x_2=12$
- c. $x_1=41$ and $x_2=29$
- d. $x_1=39$ and $x_2=10$
- e. $x_1=49$ and $x_2=22$

- d. Derive the total cost (TC) and marginal cost (MC) functions of planting Cedar trees (as functions of q).
- e. The production function for planting trees can be characterized as $q = t L^{4/5} K^{1/5}$, where "t" represents the technology used. The Shouf Nature Reserve receives funding to help it improve its tree-planting technology. Assuming the cost-minimizing proportions of labor to capital remain the same, by how much does "t" have to change (from its initial level of 0.5) to require only 1 worker and 1 unit of capital to plant a tree?

Problem 2 (20 Points): The market demand for problem sets for Introductory Economics courses at the American University of Beirut (AUB) is given by: $D(p) = 500 - 10p$. Initially, the market for problem sets is characterized by perfect competition with firms having identical total cost functions: $c(q) = q^2 + 400$.

- a. Calculate (1) the short-run supply curve for a typical firm in the industry and (2) the short-run industry supply curve (with q as a function of p).

- b. What is the long run equilibrium number of firms in this market?
- c. To better control content quality, suppose that AUB gives exclusive rights to Malik's Bookshop to sell problem sets for its Introductory Economics courses. Malik's total cost function is given by: $c(q) = 0.025q^2 + 4000$. What is the price-quantity combination that would maximize Malik's profits?
- d. What is the maximum amount that Malik's would be willing to pay AUB every year to maintain its exclusive rights to sell problem sets?
- e. Malik installs secret microphones in the showrooms of the AUB dorms and learns each customer's maximum willingness to pay. Malik's is therefore able to practice first degree price discrimination. How much will Malik's profits be now?

ECON 217

ANSWER KEYS

MIDTERM EXAM (FALL 2005-2006) AND FINAL EXAM FALL (2005-2006)

MIDTERM EXAM FALL 2005-2006

1. c
2. c
3. c
4. d
5. d
6. d
7. b
8. e
9. c
10. a
11. e
12. d
13. b
14. a
15. d
16. b
17. d
18. a
19. d
20. a
21. d
22. b
23. d
24. e
25. c
26. e
27. a

FINAL EXAM FALL 2005-2006

1. a
2. c
3. d
4. c
5. a
6. b
7. d
8. b
9. b
10. d
11. b
12. cancelled
13. b
14. d
15. b
16. b
17. d
18. a
19. b
20. c
21. c
22. c
23. c
24. d
25. c
26. d
27. e
28. b
29. b
30. b