

Midterm Examination I

ECON 2020E Intermediate Microeconomics-Producers and Market structures

Instructor:Wen Ci

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Instructions: 1) You must answer all the questions. 2) The exam will last 2.5 hours. 3) Please write your answers on the booklets clearly. 4) The exam contains **3** pages. 5) There are three big questions, each of which includes several sub-questions.

Question 1 multiple choice questions. (16 Marks)

1) A market

- A) always involves the personal exchange of goods for money.
- B) allows interactions between consumers and firms.
- C) always takes place at a physical location.
- D) has no influence on prices.

2) With respect to production, the short run is best defined as a time period

- A) lasting about six months.
- B) lasting about two years.
- C) in which all inputs are fixed.
- D) in which at least one input is fixed.

3) The Average Product of Labor is

- A) the change in total product resulting from an extra unit of labor, holding other factors constant.
- B) the ratio of output to the number of workers used to produce that output.
- C) the amount of output that can be produced by a given amount of labor.
- D) equal to the marginal product of labor when the average product is increasing.

4) Which situation is most likely to exhibit diminishing marginal returns to labor?

- A) a factory that obtains a new machine for every new worker hired
- B) a factory that hires more workers and never increases the amount of machinery
- C) a factory that increases the amount of machinery and holds the number of worker constant
- D) None of these situations will result in diminishing marginal returns to labor.

5) Consider the following two situations.

- (i) You purchase a \$10 movie ticket in advance over the Internet, but when arriving at the theater, you realize that you lost the ticket. The only way to see the movie is to purchase a new ticket.
- (ii) On the way to seeing a movie, you drop a \$10 bill. You still can afford the movie, but you have lost the \$10.

How should you, rational person, respond to the two situations?

- A) You should still see the movie in both situations
 B) You should respond the same way to each situation, whether it is to see the movie or not
 C) In the first situation, you should skip the movie; in the second, you should still see the movie
 D) In each situation, you should not see the movie.
- 6) Which of the following statements is NOT true?
 A) $AC = AFC + AVC$
 B) $C = F + VC$
 C) $AVC = \text{wage}/MP_L$
 D) $AFC = AC - AVC$
- 7) If consumers view the output of any firm in a market to be identical to the output of any other firm in the market, the demand curve for the output of any given firm
 A) will be identical to the market demand curve.
 B) will be horizontal.
 C) will be vertical.
 D) cannot be determined from the information given.
- 8) A special license is required to operate a taxi in many cities. The number of licenses is restricted. More drivers want licenses than are issued. This describes a non-perfectly competitive market because
 A) taxi services are very different.
 B) firms cannot freely enter and exit the market.
 C) transaction costs are high.
 D) the government generates revenue from the licenses.

Question 2

1. (10 marks) Please draw several isocost curves and isoquant curves in two separate properly labeled graphs. Based on the graphs, please carefully explain whether either the isocost curves or isoquant curves can cross in each graph?
2. (5 marks) Consider the following short-run production function: $q = 7L^2 - \frac{2}{3}L^3$. At what level of L do diminishing marginal returns begin?
3. (10 marks) Are the following arguments true or false? Please provide your reasons completely.
 - 1) If a firm sets marginal revenue equal to marginal cost it will make a positive economic profit.
 - 2) If a firm doesn't make a positive economic profit it will shut down.
4. (5 marks) Suppose there are 500 identical wheat farmers. For each, $TC = 40 + 7q^2$. Derive the market supply curve.

Question 3

1. (25 marks) Consider a competitive firm with the short-run cost function
 $C(q) = 10 + 2q + 7q^2$
The firm faces a market price $p=44$ for its output.
 - a. (6 marks) Derive the firm's profit maximizing outputs and maximized profits. Is the sufficient second order condition satisfied?
 - b. (8 marks) Identify the maximized profit in the properly labeled graph.
 - c. (6 marks) Suppose a specific tax (unit output tax) of t ($t < p$) is levied on only this firm in the industry. What is the profit maximizing level of output as a function of t ? (Assume the price is high enough that the firm does not shut down)
 - d. (5 marks) How does the output change as the tax increases? Use calculus to determine the relevant comparative static.

2. (15 marks) This question has you determine the effect of a tax on labor on the long-run cost function. Consider a firm with the production function $f(L,K) = 4LK$. The wage rate and rental rate on capital are w and r , respectively. Using the Lagrangian, derive the long-run cost function for this firm.

3. (14 marks) Consider two agents simultaneously deciding whether to contribute to a public good – the good is said to be public because, if it is made available, an agent who free-rides by paying nothing gets just as much pleasure from its enjoyment as an agent who paid for it. If at least one agent contributes to the construction of the public good, both agents will enjoy a payoff of four from the public good. To ensure the public good is constructed, player one must pay c_1 or player two must pay c_2 . Assume that $c_1 < 4$ and $c_2 < 4$. If neither contributes, the good is not constructed and neither player gets enjoyment from the project. If one or both players contribute, then the good is constructed and each player enjoys a payoff of four minus the contribution cost if that player has contributed.
 - a. (4 marks) Represent the game in a Normal representation form.
 - b. (8 marks) Find the Pure Nash Equilibrium. (Provide your analysis steps thoroughly)