Ecn 100 - Intermediate Microeconomics
University of California - Davis July 28, 2010
Instructor: John Parman

Final

You have until 3:50pm to complete this exam. Be certain to put your name, id number and section on both the exam and your scantron sheet and fill in test form A on the scantron. Answer all multiple choice questions on your scantron sheet. Choose the single best answer for each question; if you fill in multiple answers for a question you will be marked wrong. Answer the short answer questions directly on the exam. You must show your work for full credit. Answers may be left as fractions. Please place a box around final answers when appropriate. Good luck!

Name: **ID Number:** **Section:**

SECTION I: MULTIPLE CHOICE (60 points)

1. A competitive firm is currently maximizing profits by producing 10 units of output. If the firm is losing \$100 (profits are -\$100), which of the following must be true?
   (a) The firm's fixed costs are greater than or equal to \$100.
   (b) The firm's fixed costs are less than or equal to \$100.
   (c) The firm's fixed costs are equal to \$100.
   (d) None of the above.
2. A competive market has a linear, downward sloping demand curve and a linear, upward sloping short run supply curve. Currently, the market is in a long run equilibrium with an equilibrium price of \$10. If a quantity tax of \$4 is placed on consumers, the new equilibrium price received by sellers will:
   (a) Be less than \$6 in the short run and between \$6 and \$10 in the long run.
   (b) Be between \$6 and \$10 in the short run and between \$6 and \$10 in the long run.
   (c) Be equal to \$10 in the short run and between \$6 and \$10 in the long run.
   (d) Be between \$6 and \$10 in the short run and equal to \$10 in the long run.
3. Which of the following is definitely true at the efficient quantity in a market with one firm?
   (a) Profits are maximized.
   (b) Profits are equal to zero.
   (c) Consumer surplus is maximized.
   (d) The sum of consumer and producer surplus is maximized.
4. Suppose that when the price of capital increases relative to the price of labor, a profit-maximizing firm chooses to keep using the same ratio of capital to labor as before (both capital and labor are variable inputs and their prices are always positive). Which of the following could be the firm's production function?
   (a) $f(K,L) = KL$.
   (b) $f(K,L) = K^{\frac{1}{2}}L^{\frac{1}{2}}$.
   (c) $f(K,L) = K + L$.
   (d) All of the above.

5. Suppose that at a firm's current level of output, average costs are \$4 per unit and marginal costs are \$5 per unit. If the firm produces one more unit:
   (a) Average costs will increase.
   (b) Average variable costs will increase.
   (c) Both (a) and (b).
   (d) Neither (a) nor (b).
6. In a competitive industry with identical firms, the current market price is \$10, the number of firms is 100 and the breakeven price is \$5. In the long run:
   (a) The market price will be \$10 and the number of firms will be greater than 100.
   (b) The market price will be \$10 and the number of firms will be less than 100.
   (c) The market price will be \$5 and the number of firms will be greater than 100.
   (d) The market price will be \$5 and the number of firms will be less than 100.
7. A firm's only two inputs are wood and steel. If the marginal product of wood is positive and constant and the marginal product of steel is positive and constant, the firm's isoquants on a graph with wood on the horizontal axis and steel on the vertical axis will be:
   (a) Downward sloping and getting flatter from left to right.
   (b) Downward sloping and getting steeper from left to right.
   (c) Upward sloping and linear.
   (d) Downward sloping and linear.
8. Currently, there is a \$2 quantity tax on soda that is generating \$200 in tax revenue and \$50 in deadweight loss. The demand curve is downward sloping and the supply curve is upward sloping. If the tax is increased to \$4:
   (a) Tax revenue will definitely increase.
   (b) Deadweight loss will definitely increase.
   (c) Both (a) and (b).
   (d) Neither (a) nor (b).
9. A store offering a senior citizen discount of 10% is an example of:
   (a) Bundling.
   (b) Price discrimination.
   (c) A two-part tariff.
   (d) None of the above.

10. In the short run there are two types of firms in a competitive industry, with ten of each type. Type A firms have a shutdown price of \$10 and a marginal cost curve with a slope of 10. Type B firms have a shutdown price of \$15 and a marginal cost curve with a slope of 15. The short run industry supply curve will:
    (a) Have a vertical intercept of \$15.
    (b) Have a kink at \$15 with a slope of 10 to the left of the kink.
    (c) Have a kink at \$15 with a slope of less than 10 to the right of the kink.
    (d) Have a vertical intercept of \$25.
11. In the short run, a firm's capital is fixed at 10 units and it costs the firm \$200 to produce 20 units of output. In the long run:
    (a) It costs the firm at least \$200 to produce 20 units of output.
    (b) It costs the firm at most \$200 to produce 20 units of output.
    (c) The firm will use at least 10 units of capital to produce 20 units of output.
    (d) The firm will use at most 10 units of capital to produce 20 units of output.
12. If a firm has no fixed costs, which of the following is definitely true?
    (a) It's average cost curve will be a straight line.
    (b) It's average cost curve will be identical to its average variable cost curve.
    (c) It's profits will be greater than it's producer surplus.
    (d) It's marginal cost curve will be a straight line.
13. If the marginal product of labor is positive but diminishing, doubling the amount of labor used while holding all other inputs constant will:
    (a) Exactly double output.
    (b) More than double output.
    (c) Increase output but by less than double.
    (d) Decrease output.
14. In a competitive industry in which firms have upward sloping marginal cost curves, a permanent shift of the demand curve to the right will:
    (a) Lead to a decrease in market price in the short run.
    (b) Lead to an increase in market price in the short run.
    (c) Lead to a decrease in market price in the long run.
    (d) Lead to an increase in market price in the long run.
15. Suppose that a firm uses a fixed proportions technology where capital and labor are the only two inputs and two units of capital and one unit of labor are needed to produce each unit of output. Which of the following is true assuming the firm always produces a postive quantity of output?
    (a) The cost-minimizing ratio of capital to labor will depend on how large the wage is relative to the rental rate of capital.
    (b) The cost-minimizing ratio of capital to labor will depend on the quantity of output being produced.
    (c) The firm uses a constant returns to scale technology.
    (d) The marginal product of capital is always positive.

SECTION II: SHORT ANSWER (40 points)

1. (12 points) In order to produce a table, a firm can use either one unit of metal or two units of wood no matter how many tables have already been produced or how many units of metal and wood have already been used. A firm can produce fractions of tables and use fractions of units of inputs (for example, half a unit of metal could be used to produce half a table).
   (a) Write down a production function that gives the number of tables produced (T) as a function of the number of units of metal (M) and wood (W) used.
   (b) Suppose that the price of a unit of wood is \$5 and the price of a unit of metal is \$4. Write down a function that gives a firm's minimum costs as a function of the number of tables produced (T).
   (c) The market demand for tables is given by:

$$D(p) = 500 - 25p \tag{1}$$

   The input prices are the same as in part (b). If the market for tables is perfectly competitive, what will the long run equilibrium price and market quantity of tables be?

2. (14 points) A firm using capital and labor as its two inputs has the following production function:

$$f(K, L) = K^{\frac{1}{3}} L^{\frac{2}{3}} \tag{2}$$

   (a) Derive expressions for the marginal product of labor, the marginal product of capital and the technical rate of substitution.

   (b) The firm currenlty has 8 workers. It cannot fire the workers or hire additional workers in the short run. It can change its level of capital in the short run. If the price of output is \$9, the wage is \$6 and the rental rate of capital is \$12, how many units of capital will the firm use in the short run in order to maximize profits?

   (c) If the prices of capital and labor remain the same as in part (b), what will the ratio of capital to labor be for the firm in the long run (assuming they produce a positive amount of output)?

3. (14 points) The inverse demand for burgers (B) is given by:

$$p(B) = 50 - B \tag{3}$$

There is only one firm that sells burgers. The costs of the firm are given by:

$$C(B) = 5B^2 + 10B \tag{4}$$

(a) What price will this single firm charge, how many burgers will it sell and what will its profits be?
(b) What is the socially efficient quantity of burgers?
(c) Suppose that the government wanted to get the firm to produce at the socially efficient quantity by offering a subsidy per unit of the amount S. So if the monopolist sells units at a price of p, it will actually receive $p + S$ in revenue on each unit. Find the level of S that would lead the monopolist to produce the socially efficient quantity.