Ecn 100 - Intermediate Microeconomic Theory
University of California - Davis May 14, 2009
Instructor: John Parman

Midterm 2

You have until 4:30pm 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 long 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. If a production technology exhibits diminishing marginal product of labor and the 10th worker hired increases output by 20 units:
   (a) The 20th worker hired will increase output by more than 20 units.
   (b) The 20th worker hired will decrease output
   (c) The 5th worker hired will increase output by more than 20 units.
   (d) The 5th worker hired will decrease output.
2. A market has two consumers. Each consumer has a downward sloping demand curve with a slope of -2. The market demand curve:
   (a) May be upward sloping.
   (b) Will have a slope of -2.
   (c) Will have a slope between 0 and -2.
   (d) Will be steeper than the individual demand curves.
3. If the price of x increases, the income and substitution effects for good y will have different signs if:
   (a) y is an inferior good.
   (b) y is a normal good.
   (c) y is a Giffen good.
   (d) They will have the same sign no matter what type of good y is.
4. At current prices, the price elasticity of demand for pizza is $-\frac{4}{5}$. Which if the following will happen if the pizza parlor raises its price by a small amount?
   (a) Demand for pizza will increase.
   (b) Revenues will increase.
   (c) Costs will increase.
   (d) Profits will decrease.

5. On a graph with labor on the horizontal axis and capital on the vertical axis, the _____, the steeper an isoquant will be:
   (a) The smaller the marginal product of capital.
   (b) The smaller the marginal product of labor.
   (c) The larger the marginal product of capital.
   (d) (b) and (c).
6. If supply is completely inelastic, then a quantity tax placed on consumers will:
   (a) Increase the equilibrium price paid by consumers but by less than the amount of the tax.
   (b) Decrease the equilibrium price received by producers but by less than the amount of the tax.
   (c) Increase the equilibrium price paid by consumers by the full amount of the tax.
   (d) Decrease the equilibrium price received by producers by the full amount of the tax.
7. Given an upward sloping linear supply curve and a downward sloping linear demand curve, deadweight loss will _____ as the size of a quantity tax is increased.
   (a) First increase, then decrease.
   (b) First decrease, then increase.
   (c) Steadily increase.
   (d) Steadily decrease.
8. If capital is fixed in the short run and labor is variable, increasing the price of capital will _____. (Assume that before and after the price change the firm finds it optimal to produce a positive quantity of output.):
   (a) Lead the firm to use more labor in the short run.
   (b) Lead the firm to use less labor in the short run.
   (c) Lead the firm to produce less output in the short run.
   (d) None of the above.
9. If tacos and salsa are complements, when the price of a taco increases:
   (a) The magnitude of the substitution effect for salsa will be larger than the magnitude of the income effect.
   (b) The magnitude of the substitution effect for salsa will be smaller than the magnitude of the income effect.
   (c) The sign of the income and substitution effects for salsa will be the same.
   (d) None of the above.
10. Suppose that widgets are produced with a constant returns to scale technology that uses only capital and labor. If a firm is currently earning a profit of $100 using 10 units of capital and 10 units of labor, then profits when the firm uses 20 units of capital and 20 units of labor will be:
    (a) Greater than $200.
    (b) Greater than $100 but less than $200.
    (c) Equal to $200.
    (d) Not enough information.

11. The cross price elasticity of demand for apples and oranges is -1.6. Which of the following can we say for certain:
    (a) Apples and oranges are substitutes.
    (b) Demand for apples in elastic.
    (c) Apples and oranges are complements.
    (d) Demand for oranges is inelastic.
12. If a quantity tax placed on producers lowers the equilibrium price received by producers and raises and equilibrium price paid by consumers, which of the following is definitely true:
    (a) The loss in consumer surplus will be larger than the loss in producer surplus.
    (b) The loss in consumer surplus will be less than or equal to the loss in producer surplus.
    (c) The loss in consumer and producer surplus will be greater than the tax revenue.
    (d) The loss in consumer and producer surplus will be smaller than the tax revenue.
13. The isoquants for the production function $f(K, L) = 2K + 3L$ will:
    (a) Be straight lines.
    (b) Be concave.
    (c) Have a dimishing technical rate of substitution.
    (d) Have an increasing technical rate of substitution.
14. Suppose we use electricity (E) and typists (T) to produce books. In the short run, electricity is fixed but the number of typists is variable. Which of the following prices would affect the optimal number of typists? (You can assume that we never reach the point where it is optimal to shut down, so the optimal number of typists will be postive.)
    (a) The price of books and the price of electricity.
    (b) The price of electricity and the price of typists
    (c) The price of books and the price of typists.
    (d) The price of books, the price of electricity and the price of typists.
15. Think about the following sets of goods: hamburgers from McDonald's, hamburgers in general, sandwiches in general (including hamburgers). Which of the following is the most likely ordering of the price elasticity of demand for the different goods, from largest in magnitude to smallest in magnitude:
    (a) McDonald's hamburgers, hamburgers in general, sandwiches in general.
    (b) McDonald's hamburgers, sandwiches in general, hamburgers in general.
    (c) Sandwiches in general, hamburgers in general, McDonald's hamburgers.
    (d) Hamburgers in general, sandwiches in general, McDonald's hamburgers.
16. Suppose we produce output with two inputs, A and B. The production function is $f(A, B) = A^2 + B$. This technology exhibits:
    (a) Constant returns to scale.
    (b) Increasing returns to scale.
    (c) Decreasing returns to scale.
    (d) Not enough information.

17. If the marginal product of labor is increasing and positive at all levels of labor, a graph of output as a function of labor will:
    (a) Have a positive slope and get steeper as L gets larger.
    (b) Have a negative slope and get flatter as L gets larger.
    (c) Have a positive slope and get flatter as L gets larger.
    (d) Have a negative slope and get steeper as L gets larger.
18. If we use only wood and glue to make bookcases and we always have to use them in fixed proportions, then:
    (a) The technical rate of substitution will be decreasing.
    (b) The technical rate of substitution will be increasing.
    (c) The technical rate of substitution will be constant.
    (d) The technical rate of substitution will be increasing at some levels of inputs and decreasing at other.
19. Suppose that we have three consumers in the market for DVDs and all of them have downward sloping, linear demand curves. The market demand curve has a kink at the point (20 DVDs, \$10). Which of the following is true?
    (a) There is a consumer who will not pay more than \$10 for a DVD.
    (b) None of the consumers will pay more than \$10 for a DVD.
    (c) The market demand curve is steeper to the right of the kink than to the left of it.
    (d) There is a consumer who stops buying DVDs when the price drops below \$10.
20. On a graph of output as a function of capital, with capital on the horizontal axis, the slope of the curve is:
    (a) Equal to the marginal product of capital.
    (b) Equal to the marginal product of labor.
    (c) Equal to the technical rate of substitution.
    (d) None of the above.

SECTION II: SHORT ANSWER (40 points)

For this section, be certain to show your work and clearly label any graphs you draw. Give complete answers but keep them concise. Please place a box around final answers where appropriate.

1. (8 points) There are two consumers, a and b, in the market for coffee (C). There individual inverse demand curves are given by:

$$P(C_a) = 10 - C_a \tag{1}$$

$$P(C_b) = 20 - C_b \tag{2}$$

   Graph the market demand curve. Make certain to label all slopes, intercepts and kinks with the appropriate values.

2. (16 points) A car manufacturer uses only capital (K) and labor (L) as inputs and has the following production function:

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

In the short run, capital is fixed at 25 units, the price of a car is \$10, the rental rate of capital is \$2 and the wage for a worker is \$1.

(a) Derive expressions for the marginal product of capital, the marginal product of labor and the technical rate of substitution.
(b) On a graph with labor on the horizontal axis and cars on the vertical axis, sketch cars as a function of labor in the short run. Include the equation for the curve on the graph.
(c) On the same graph, sketch two isoprofit lines, one for a profit level of \$50 and one for a profit level of \$100. Be certain to clearly label the slopes and intercepts of these isoprofit lines with their actual values.
(d) Find the optimal level of labor in the short run.

3. (16 points) The market for newspapers (N) has the following market demand and market supply functions:

$$D(p_N) = 100 - p_N \tag{4}$$

$$S(p_N) = p_N \tag{5}$$

   (a) Find the equilibrium price and quantity of newspapers.
   (b) A tax of \$10 is placed on consumers. Find the new equilibrium quantity of newspapers, price paid by consumers and price received by producers.
   (c) Calculate the tax revenue generated by the tax and the deadweight loss created by the tax.
   (d) If demand were given by $D(p_N) = 150 - p_N$ would the tax revenue be larger, smaller or the same as what you found in part (c)? Would the deadweight loss be larger, smaller or the same as what you found in part (c)? (You can use either calculations or a graph to justify your answer.)