Midterm 2

You have until 11:50am 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. Suppose that pizza is an ordinary good for both Alex and Betsy. If Alex's demand for pizza is more inelastic than Betsy's, a one percent increase in the price of pizza:

   (a) Will lead to a greater percentage decrease in pizza purchased for Alex than for Betsy.
   (b) Will lead to a greater percentage decrease in pizza purchased for Betsy than for Alex.
   (c) Will lead to an increase in pizza purchased for both Alex and Betsy.
   (d) Will have the same affect on the pizza purchased by both Alex and Betsy.

2. Suppose that the market for candy has a negatively sloped linear demand curve and a positively sloped linear supply curve. A quantity tax placed on consumers will:

   (a) Generate a deadweight loss at least as large as the revenue generated from the tax.
   (b) Generate a deadweight loss smaller than the revenue generated from the tax.
   (c) Generate a deadweight loss equal to the revenue generated from the tax.
   (d) Not enough information.

3. Suppose that computers are made using machines and workers and the production technology is convex and monotonic. If 4 workers and 8 machines can produce 10 computers and 8 workers and 4 machines can also produce 10 computers, then 6 workers and 7 machines can produce:

   (a) Exactly 10 computers.
   (b) At least 10 computers.
   (c) Less than 10 computers.
   (d) Not enough information.

4. The demand for wheat bread is likely to be:

   (a) More elastic than the demand for bread in general.
   (b) More inelastic than the demand for bread in general.
   (c) Less elastic than the demand for bread in general.
   (d) Just as elastic as the demand for bread in general.

5. If a firm using capital and labor as inputs has isoquants that are straight lines, then:

    (a) The firm's technology exhibits a diminishing technical rate of substitution.
    (b) The marginal product of labor equals the marginal product of capital.
    (c) The ratio of the marginal product of capital to the marginal product of labor is constant.
    (d) Both (a) and (c).

6. A kink in the market demand curve typically occurs when:

    (a) The price drops below some consumer's maximum willingness to pay.
    (b) An additional firm enters the market.
    (c) A change in demand occurs on along the intensive margin.
    (d) A firm leaves the market.

7. Carl consumes only apples and oranges and apples are a normal good. If the magnitudes of the substitution and income effects for apples are equal when the price of oranges goes up, we can say that:

    (a) Apples and oranges are substitutes.
    (b) Apples and oranges are complements.
    (c) The quantity of apples consumed goes up when the price of oranges goes up.
    (d) The quantity of apples consumed does not change when the price of oranges goes up.

8. Suppose that capital and labor are the only inputs used by a firm and that capital is fixed in the short run. If each additional worker increases output by 10 units and the price of output is $2 a unit, what is the highest wage the firm is willing to pay in the short run?

    (a) $10.
    (b) $20.
    (c) $5.
    (d) $2.

9. Which of the following is not possible if a production technology using capital and labor as inputs is monotonic?

    (a) The marginal product of capital is diminishing.
    (b) The technical rate of substitution is negative.
    (c) The marginal product of labor is negative.
    (d) The marginal product of capital is increasing.

10. Suppose that capital is our only variable input in the short run. To maximize profits, we should choose the level of capital where:

    (a) The price of a unit output is equal to the price of a unit of capital.
    (b) The marginal product of capital is equal to the price of a unit of capital.
    (c) The dollar value of the marginal product of capital is equal to the price of a unit of output.
    (d) The dollar value of the marginal product of capital is equal to the price of a unit of capital.

11. The market for ice cream has two consumers. The consumers have identical individual demand curves, each with a slope of -2. The slope of the market demand curve will be:

   (a) -4.
   (b) -2.
   (c) -1.
   (d) $-\frac{1}{2}$.

12. When a $3 quantity tax is placed on consumers, one third of the burden of the tax falls on consumers while two thirds falls on producers. If the tax is instead placed on producers, the portion of the tax burden falling on consumers will be:

   (a) $1.
   (b) $2.
   (c) $3.
   (d) It depends on the original equilibrium price.

13. When a record store raises the price of a record by 2 percent, revenues go down by 1 percent. This tells us that:

   (a) The demand for records is elastic.
   (b) The demand for records is inelastic.
   (c) The demand for records is perfectly elastic.
   (d) The demand for records is perfectly inelastic.

14. Suppose that capital is a fixed input in the short run and labor is a variable input. A decrease in the price of capital will:

   (a) Increase the short-run profit-maximizing level of labor.
   (b) Decrease the short-run profit-maximizing level of labor.
   (c) Increase the level of short-run profits.
   (d) Decrease the level of short-run profits.

15. If sweaters are a normal good, we can say for certain that:

   (a) The income elasticity for sweaters is greater than 1.
   (b) The income elasticity for sweaters is less than 1.
   (c) The income elasticity for sweaters is less than -1.
   (d) None of the above.

SECTION II: SHORT ANSWER (40 points)

1. (14 points) Dennis consumes only coffee and bagels, both of which are normal, ordinary goods. Coffee and bagels are complements. Dennis has standard, convex indifference curves. Draw a graph that shows the income and substitution effects for both coffee and bagels when the price of bagels decreases. Your graph should have bagels on the horizontal axis and coffee on the vertical axis. Be certain to label your graph clearly (including all relevant budget lines and bundles) and to show both the magnitude and direction of the effects.

2. (12 points) The market demand for paintings is given by:

$$D(p) = 100 - p \tag{1}$$

The market supply for paintings is perfectly inelastic: 50 paintings are supplied no matter what the price of a painting is.

(a) Find the equilibrium price of and quantity of paintings. Be certain to show your work.

(b) Suppose that a \$10 quantity tax is placed on consumers. Find the new equilibrium quantity, the new equilibrium price paid by consumers and the new equilibrium price received by painters.

(c) What was the change in consumer surplus resulting from the tax? How much tax revenue was generated?

3. (14 points) Suppose that a firm makes cars using metal (M) and fiberglass (F). The firm's production function is given by:

$$f(M,F) = M^{\frac{1}{2}} + F^{\frac{1}{2}} \tag{2}$$

In the short run, the firm's metal is fixed at 100 units but fiberglass is a variable input. The price of a car is \$2,000 and the price of a unit of fiberglass is \$100.

(a) Derive expressions for the marginal product of metal and the marginal product of fiberglass.

(b) How many units of fiberglass will the firm use in the short run?

(c) How many cars will the firm produce in the short run?

(d) Derive an expression for the short run demand for fiberglass as a function of the price of fiberglass (w_F).