Final Exam

You have until 12:30 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. Abel consumes only chocolate and coffee and is currently maximizing his utility by consuming four chocolate bars and five cups of coffee. We can say for certain that at this current bundle:

   (a) An additional dollar spent on coffee would increase utility the same amount as an additional dollar spent on chocolate.
   (b) An additional unit of coffee would increase utility the same amount as an additional unit of chocolate.
   (c) An additional unit of coffee would increase utility by more than an additional unit of chocolate.
   (d) An additional dollar spent on coffee would increase utility by more than an addtional dollar spent on chocolate.

2. In a competitive industry, a permanent shift of the demand curve to the right will lead to:

   (a) A higher price and more firms in the long run.
   (b) More firms in the long run but no change in the long run price.
   (c) A lower price and fewer firms in the long run.
   (d) Fewer firms in the long run but no change in the long run price.

3. Which of the following would change the slope of a consumer's budget line?

   (a) Doubling the price of the good on the horizontal axis.
   (b) Doubling income.
   (c) Doubling the prices of both goods.
   (d) All of the above.

4. Suppose that a firm uses only machines and workers to produce output. If the marginal product of machines and the marginal product of workers are both positive constants, the firm's isoquants will be:

   (a) Upward-sloping straight lines.
   (b) Downward-sloping straight lines.
   (c) Upward-sloping and getting flatter when moving from left to right.
   (d) Downward-sloping and getting flatter when moving from left to right.

5. For a profit-maximizing monopolist facing a downward-sloping linear demand curve, at any positive quantity of output:

    (a) Marginal revenue will be equal to the price the monopolist charges per unit.
    (b) Marginal revenue will be greater than the price the monopolist charges per unit.
    (c) Marginal revenue will be less than the price the monopolist charges per unit.
    (d) Not enough information.

6. Suppose that Bill's utility goes up when the number of magazines he reads increases and goes down when the number of textbooks he reads increases. On a graph with magazines on the horizontal axis and textbooks on the vertical axis, Bill's indifference curves will be:

    (a) Downward sloping.
    (b) Upward sloping.
    (c) Horizontal lines.
    (d) Vertical lines.

7. Suppose that a firm uses capital and labor to produce widgets and has a monotonic production technology. Which of the following cannot be true?

    (a) The firm's technical rate of substitution is increasing.
    (b) The firm's technical rate of substitution is decreasing.
    (c) The marginal product of capital is positive.
    (d) The marginal product of labor is negative.

8. A monopolist faces a linear, downward-sloping demand curve. In which of the following cases would a profit-maximizing monopolist not generate a deadweight loss?

    (a) When the marginal cost curve for the monopolist is upward sloping.
    (b) When the marginal cost curve for the monopolist is a horizontal line.
    (c) There would be deadweight loss in both (a) and (b).
    (d) Neither (a) nor (b) would lead to a deadweight loss.

9. Coffee is a normal, ordinary good. If the price of coffee goes up, demand for coffee will _____ and the income and substitution effects for coffee will have _____.

    (a) Increase, opposite signs.
    (b) Increase, the same signs.
    (c) Decrease, opposite signs.
    (d) Decrease, the same signs.

10. Suppose there are one hundred identical firms in the market for bagels. Each firm has a supply curve with a slope of 100. The industry supply curve will have a slope:

    (a) Greater than 100.
    (b) Equal to 100.
    (c) Less than 100.
    (d) Not enough information.

11. In the short run, the number of machines a firm uses is fixed at 100 but the firm can vary the number of workers it employs. The short run costs of producing 500 units of output will be:

   (a) Greater than the long run costs of producing 500 units of output.
   (b) Less than the long run costs of producing 500 units of output.
   (c) Equal to the long run costs of producing 500 units of output.
   (d) (a) or (c) could be true.

12. Suppose that in a competitive industry, the market price is currently above each firm's average variable cost and below each firm's average total cost. Which of the following will happen?

   (a) Firms will enter the industry and market price will increase.
   (b) Firms will enter the industry and market price will decrease.
   (c) Firms will leave the industry and market price will increase.
   (d) Firms will leave the industry and market price will decrease.

13. Peanut butter and jelly are complements. If the price of jelly increases:

   (a) The short run supply curve for peanut butter will shift to the right.
   (b) The demand curve for peanut butter will shift to the right.
   (c) The short run supply curve for peanut butter will shift to the left.
   (d) The demand curve for peanut butter will shift to the left.

14. In a competitive market, the long run equilibrium will occur at:

   (a) A market quantity equal to the efficient quantity.
   (b) A market price equal to the individual firms' breakeven prices.
   (c) Both (a) and (b).
   (d) Neither (a) nor (b).

15. Suppose that supply is perfectly elastic and the demand curve is downward sloping. A quantity tax placed on consumers will:

   (a) Increase consumer surplus.
   (b) Decrease the price received by producers.
   (c) Decrease consumer surplus.
   (d) Decrease producer surplus.

16. Which of the following statements must be true?

   (a) If a firm's marginal costs are increasing, its average costs must be increasing.
   (b) If a firm's marginal costs are increasing, its average variable costs must be increasing.
   (c) If a firm's marginal costs are above its average costs, its average costs must be increasing.
   (d) If a firm's marginal costs are above its average variable costs, its average costs must be increasing.

17. Potato chips and soda are both normal goods and are the only goods that Christine consumes. The Engel curve for potato chips and the income offer curve will:

   (a) Both be downward sloping.
   (b) Both be upward sloping.
   (c) Neither (a) nor (b).
   (d) Not enough information.

18. A firm is currently using a combination of inputs where the slope of the isoquant is steeper than the slope of the isocost curve. The firm can increase output without changing costs by:

    (a) Using more of the input on the horizontal axis and less of the input on the vertical axis.
    (b) Using more of the input on the vertical axis and less of the input on the horizontal axis.
    (c) Using more of both inputs.
    (d) Using less of both inputs.

19. A good with many close substitutes will tend to have _____ than a good with no close substitutes.

    (a) More elastic demand.
    (b) Less elastic demand.
    (c) More inelastic demand.
    (d) Both (b) and (c).

20. Suppose a firm uses only capital and labor to produce output and the marginal products of capital and labor are both positive constants. Which of the following is not true?

    (a) The firm's production technology exhibits increasing returns to scale.
    (b) The firm's production technology is monotonic.
    (c) The firm's technical rate of substitution is constant.
    (d) The firm's isocost lines are downward sloping.

SECTION II: SHORT ANSWER (40 points)

1. (10 points) On the graph below, one isoquant (curve A) and one isocost line (curve B) are shown for a firm. The isoquant and isocost line intersect at two different combinations of capital and labor. These points of intersection are labeled as C and D on the graph. The firm is currently on both isoquant A and the isocost line B. In other words, the firm is currently at either point C or point D.
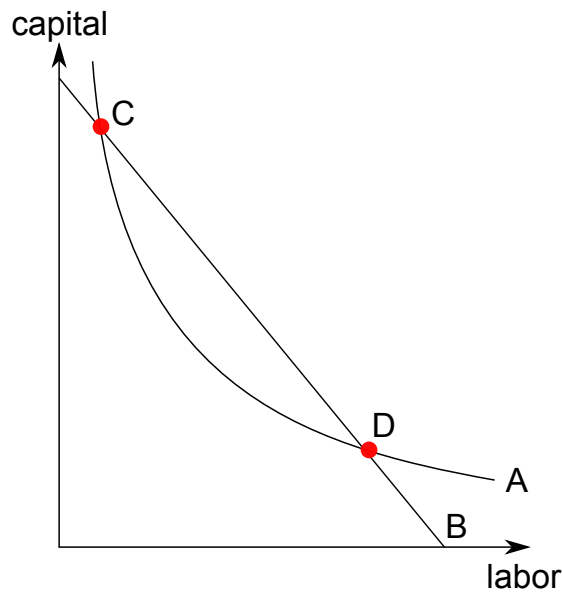
(a) Suppose that the current rental rate of capital is \$2 and the current wage is \$10. The current marginal product of capital is 10 and the current marginal product of labor is 15. Based on this information, is the firm currently at point C or at point D? Explain your answer.

(b) Suppose that the firm decides to hold output at its current level but adjust its inputs to minimize total costs. Show on the graph which combination of inputs the firm will move to. Label this point E. Add and clearly label any additional isocost lines or isoquants that are needed to determine the location of this cost-minimizing bundle.

(c) Now suppose that the firm develops a new technology that leads to greater output at any given combination of inputs compared to the original technology. This new technology still exhibits a diminishing technical rate of substitution. Show on the graph how this change in technology affects isoquant A. In other words, draw a new isoquant that corresponds to the same level of output as isoquant A but is based on the new technology. Label this new isoquant A'.

2. (14 points) A monopolist has the following cost function:

$$C(y) = 30y \tag{1}$$

The demand curve for the industry is given by:

$$D(p) = 1000 - 25p \tag{2}$$

(a) Derive expressions for marginal cost, $MC(y)$, and marginal revenue, $MR(y)$, for the monopolist.

(b) What price will the monopolist charge and how many units of output will it produce?

(c) What is the socially efficient quantity (the quantity that maximizes total surplus)?

3. (16 points) The industry for laptops is perfectly competitive; all firms are price takers. Currently there are ten different firms, each with the following cost function:

$$C(L) = L^3 - 20L^2 + 110L \tag{3}$$

where L is the number of laptops produced. In the short run, no firms can enter or leave the industry. Firms currently in the industry can decide to produce zero laptops. In the long run, firms can freely enter and leave the industry.

(a) Derive expressions for the marginal costs of each firm and the average costs of each firm in terms of L.

(b) Suppose that the market price is currently $110. How many laptops is each firm producing, assuming they are all maximizing profits? (You can assume that firms can produce fractions of laptops.)

(c) Determine whether the number of firms will increase or decrease once firms are able to enter or leave the industry. Be certain to fully justify your answer.

(d) What will the equilibrium price be in the long run?