# Final Exam

You have until 5:30pm to complete the exam, be certain to use your time wisely. For multiple choice questions, mark your answer on your scantron sheet. Choose only one answer for each multiple choice question; if more than one letter is filled in for a question it will be marked wrong. For the short answer questions, write your answers directly on the exam. Show your work clearly, place a box around final answers and be certain to label any graphs you draw. Final answers may be left as fractions. Non-graphing calculators may be used but they should not be necessary. Good luck!

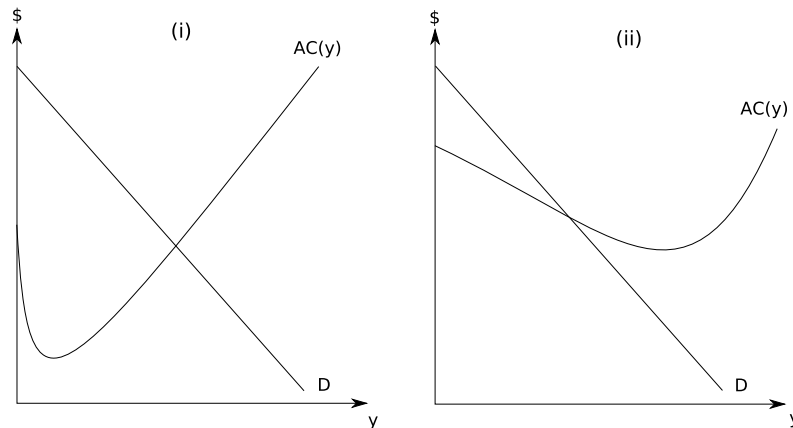**Name:**                              **ID Number:**                         **Section:**

SECTION I: MULTIPLE CHOICE (60 points)

1. The short run costs of producing an amount of output $y$ will be _____ the long run costs of producing the same amount of output.

   (a) Greater than or equal to.
   (b) Strictly greater than
   (c) Less than or equal to.
   (d) Strictly less than.

2. When the marginal cost curve lies above the average cost curve, average costs will be:

   (a) Increasing as output increases.
   (b) Decreasing as output increases.
   (c) Constant as output increases.
   (d) They may be increasing or decreasing as output increases.

3. On a graph with good $x$ on the horizontal axis and good $y$ on the vertical axis, the larger the price of good $x$ is relative to the price of good $y$:

   (a) The steeper the budget line will be.
   (b) The flatter the budget line will be.
   (c) The steeper the indifference curves will be.
   (d) The flatter the indifference curves will be.

4. A firm's production function is given by $f(K, L) = KL$ where $K$ is capital and $L$ is labor. The marginal product of labor for this firm is:

   (a) Decreasing as $L$ gets larger.
   (b) Increasing as $L$ gets larger.
   (c) Decreasing as $K$ gets larger.
   (d) Increasing as $K$ gets larger.

5. Which of the following is not a difference between monopolies and perfectly competitive firms?

   (a) Industry supply tends to be lower for a monopoly than a competitive industry.
   (b) Market price tends to be higher for a monopoly than a competitive industry.
   (c) Firm profits tend to be higher for a monopoly than a competitive firm in the long run.

(d) Monopolies determine quantity by setting marginal revenue equal to marginal cost while competitive firms cannot choose quantity.

6. If goods $x$ and $y$ are complements and are normal, ordinary goods, an increase in the price of good $x$ will lead to:

   (a) An increase in demand for $y$ and a decrease in demand for $x$.
   (b) An increase in demand for $x$ and a decrease in demand for $y$.
   (c) An increase in demand for both $x$ and $y$.
   (d) A decrease in demand for both $x$ and $y$.

7. In a competitive industry, the long run output per firm will:

   (a) Depend on the slope of the demand curve.
   (b) Depend on the number of firms in the industry.
   (c) Depend on where the minimum of the average cost curve is.
   (d) Depend on the size of fixed costs.

8. If demand for pizza is downward sloping and supply is upward sloping, increasing the size of a quantity tax on pizza will:

   (a) Decrease the amount of pizza sold and increase deadweight loss.
   (b) Increase the amount of pizza sold and increase deadweight loss.
   (c) Decrease the amount of pizza sold and decrease deadweight loss.
   (d) Increase the amount of pizza sold and decrease deadwieght loss.

9. Compared to the case of no price discrimination, first degree price discrimination will:

   (a) Lead to a more socially efficient outcome but lower firm profits.
   (b) Lead to a more socially efficient outcome but lower consumer surplus.
   (c) Lead to a less socially efficient outcome but greater firm profits.
   (d) Lead to a less socially efficient outcome but greater consumer surplus.

10. A quantity tax placed on consumers in a perfectly competitive industry will:

    (a) Lead to a higher price paid by consumers in the short run and an even higher price paid by consumers in the long run.
    (b) Lead to a lower price received by producers in the short run and an even lower price received by producers in the long run.
    (c) Lead to a greater burden on firms in the long run than in the short run.
    (d) Lead to a greater burden on consumers in the short run than in the long run.

11. A firm has two factories, $A$ and $B$ with the following cost functions: $C_A(y) = 4y^2$ and $C_B(y) = 2y^2$. Which of the following is true if the firm is maximizing profits and producing a positive amount of output?

    (a) The firm will use both factories but will be producing more output at factory $A$ than at factory $B$.
    (b) The firm will use both factories but will be producing more output at factory $B$ than at factory $A$.
    (c) The firm will only use factory $A$.
    (d) The firm will only use factory $B$.

12. If apples are a normal good, the income elasticity of demand for apples will be:

(a) Positive.

(b) Negative.

(c) Positive at high income levels and negative at low income levels.

(d) Positive at low income levels and negative at high income levels.

13. At a competitive firm's current level of output, the firm's total revenue is less than the firm's total variable cost. Which of the following is true?

(a) The firm is maximizing profits.

(b) The firm should be producing fewer units.

(c) The firm's average costs are lower than the price.

(d) Producer surplus is positive.

14. If apples and oranges are both normal, ordinary goods and the price of apples increases:

(a) Both the income and substitution effects for apples will be positive.

(b) Both the income and substitution effects for apples will be negative.

(c) The sign of the income effect for apples will depend on whether apples and oranges are complements or substitutes.

(d) The sign of the substitution effect for apples will depend on whether apples and oranges are complements or substitutes.



Use the graphs above of two different markets to answer questions (15) and (16). Each graph shows the average cost curve for a monopolist and the market demand curve.

15. Which of the two monopolists would be earning a positive profit?

(a) (i) only.

(b) (ii) only.

(c) (i) and (ii).

(d) Not enough information.

16. Which of the two monopolists would earn positive profits at the socially efficient quantity?

(a) (i) only.

(b) (ii) only.

(c) (i) and (ii).

(d) Neither.

17. For a competitive industry with many firms, each of which has an upward sloping marginal cost curve, the short run industry supply curve will be _____ an individual firm's marginal cost curve and _____ the long run industry supply curve.

    (a) Flatter than, flatter than.
    (b) Flatter than, steeper than.
    (c) Steeper than, flatter than.
    (d) Steeper than, steeper than.

18. Which of the following might change an individual's optimal consumption bundle?

    (a) A doubling of all prices and income.
    (b) All prices and income being cut in half.
    (c) A doubling of all prices and income being cut in half.
    (d) Doubling the individual's utility function.

19. Suppose that all firms in a competitive industry have the same cost function and the minimum of the average cost for a firm is $10, occurring at an output level of 15. If market demand is given by $D(p) = 150 - 3p$, how many firms will there be in the long run?

    (a) 8.
    (b) 10.
    (c) 12.
    (d) 15.

20. If demand for bread is currently inelastic, a store can increase total revenues by:

    (a) Increasing the price of bread.
    (b) Decreasing the price of bread.
    (c) The store cannot change revenues.
    (d) It will depend on the cost curves of the store.

21. A monopoly will be most likely to occur:

    (a) In an industry with no barriers to entry or exit.
    (b) In an industry with a very small minimum efficient scale and a very large market demand.
    (c) In an industry with no fixed costs and low, constant marginal costs.
    (d) In an industry with a very large minimum efficient scale and a relatively small level of demand.

22. The average costs for a firm with increasing returns to scale will:

    (a) Decrease as output increases.
    (b) Increase as output increases.
    (c) Stay constant as output increases.
    (d) Increase as output increases but by less and less.

23. For a profit-maximizing firm in a competitive industry:

    (a) Profits may be negative in the short run but producer surplus will always be greater than or equal to zero.
    (b) Profits and producer surplus may be negative in the short run.
    (c) Profits and producer surplus always be positive in the long run.

   (d) Producer surplus may be negative in the short run but profits will always be greater than or equal to zero.

24. The utility function $U(x,y) = x + y$ exhibits:

   (a) A diminishing marginal rate of substitution.
   (b) A increasing marginal rate of substitution.
   (c) A constant marginal rate of substitution.
   (d) Not enough information.

25. The technical rate of substitution is given by:

   (a) The slope of the isocost curve.
   (b) The slope of the isoquant.
   (c) The slope of the budget line.
   (d) The slope of the production function.

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. A firm in a perfectly competitive industry uses two different factories, $A$ and $B$, to produce output $y$. The cost functions for the two factories are the following:

$$C_A(y_A) = \frac{1}{3}y_A^3 \tag{1}$$

$$C_B(y_B) = \frac{4}{3}y_B^3 \tag{2}$$

   (a) Using the above cost functions and what you know about how a firm divides output between factories, find an expression for the amount of output produced at factory $A$ ($y_A$) in terms of the amount of output produced at factory $B$ ($y_B$). You must show your work to get full credit. (4 points)
   (b) Given your answer in part (a), find an expression for the firm's total costs of producing $y$, $C(y)$. Your expression should contain only constants and $y$. The final expression should not contain $y_A$ or $y_B$. (4 points)
   (c) If the market price is $100, how many units of ouptut will the firm produce? (4 points)

2. A monopolist has a cost function given by $C(y) = 10y^2$. The inverse demand curve for the market is given by:

$$p(y) = 600 - 5y \tag{3}$$

   (a) Find expressions for the monopoly's total revenue as a function of $y$ and for the monopoly's marginal revenue as a function of $y$. (3 points)
   (b) Find the price charged by the monopoly and the quantity produced when the monopoly cannot price discriminate. (4 points)
   (c) Calculate the deadweight loss generated under the monopoly outcome you found in part (b). (4 points)
   (d) Suppose that the monopoly can use first degree price discrimination. What quantity will the monopoly produce and what will the deadweight loss be? (4 points)

3. There are two types of firms in a competitive industry, type $A$ and type $B$. There are 10 of each type of firm. The cost functions of the individual firms are given by:

$$C_A(y) = y^2 + 5y \tag{4}$$

$$C_B(y) = y^2 + 10y \tag{5}$$

   (a) Find an expression for the industry supply function, $S(p)$, and graph the supply function, labeling all slopes, intercepts and kinks. (5 points)
   (b) Suppose that the market demand function is $D(p) = 150 - 5p$. What will be the equilibrium price? What quantity will be produced by an individual firm of type $A$ and an individual firm of type $B$? (5 points)
   (c) What will the market price and total quantity sold be in the long run? (3 points)