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AMERICAN UNIVERSITY of BEIRUT
SCHOOL of BUSINESS
BUSS. 230
FINAL EXAM



Wednesday, January 22, 2003

NAME: _____

ID: _____

SECTION: _____

INSTRUCTOR: _____

ANSWER ALL QUESTIONS.

TOTAL TIME ALLOWED: 2 hours

I. Multiple choice (20 points total). Circle the correct answer in each of the following 20 questions – (1 point for each correct answer)

1. If the price of a good increases while the quantity of the good exchanged on markets also increases, the most likely explanation is that there has been:
 - a. An increase in demand.
 - b. A decrease in demand.
 - c. An increase in supply.
 - d. A decrease in supply.
 - e. A change in consumer tastes.

2. The optimal amount of pollution in society is where:
 - a. The total cost of pollution is equal to zero.
 - b. The total benefit from pollution is equal to zero.
 - c. The marginal benefit of pollution reduction equals the marginal cost of pollution reduction.
 - d. There is no pollution at all.
 - e. Pollution is confined to uninhabited areas.

3. The price elasticity of demand for a firm's product has been estimated at "-1.8". The firm currently sells 4,000 units a day at a price of 2 per unit. If the firm increases its product price by 10%, then it can expect to sell approximately:
 - a. 4720 units.
 - b. 3280 units.
 - c. 2560 units.
 - d. 1980 units.
 - e. 1720 units.

4. If the calculated t-value for the slope of a linear regression equation is equal to 3.614 and the critical values of the t-distribution at the 1% and 5% levels of significance, respectively, are 3.499 and 2.365, then the slope is:
 - a. Not significantly different from zero.
 - b. Significantly different from zero at both the 1% and 5% levels.
 - c. Significantly different from zero at the 1% level but not at the 5% level.



- d. Significantly different from zero at the 5% level but not at the 1% level.
 - e. Cannot tell. Need information on the number of observations and degrees of freedom.
5. Regression analysis was used to estimate coefficients of the following equation from quarterly data: $S_t = 10.5 + 0.25 t$. Using this equation, what would be the value of the dependent variable after 3 years:
- a. 19.5
 - b. 13.5
 - c. 11.25
 - d. 10.5
 - e. 7.5
6. The marginal revenue product of labor for a firm:
- a. Will increase if the price of the firm's output increases.
 - b. Is the firm's demand function for labor?
 - c. Will decrease if the firm hires more labor.
 - d. All of the above are correct.
 - e. None of the above is correct.
7. A firm's combination of inputs is optimal:
- a. At points of tangency between isoquants and isocosts.
 - b. If the marginal revenue product is equal to the marginal resource cost for each input.
 - c. If the marginal rate of technical substitution between every pair of inputs is equal to the ratio of the prices of those inputs.
 - d. All of the above are correct.
 - e. Both a and c are correct.
8. If the output elasticities of all inputs used by a firm are summed together, then the total:
- a. Will be greater than one if returns to scale are decreasing.
 - b. Will be equal to one if returns to scale are constant.
 - c. Will be less than one if returns to scale are increasing.
 - d. Will always exceed one in the long run.
 - e. Will always exceed one in the short run.
9. A firm that has total fixed costs of 20,000, sells its output for 150 a unit, and has an average variable cost of 200. If the firm's cost and revenue curves are linear, how much output must the firm produce to **break even**:
- a. 1,000.
 - b. 600.
 - c. 400
 - d. 200.
 - e. The firm cannot break even.

10. The long-run average cost curve reaches a minimum at the level of output where:
- The firm is experiencing constant returns to scale.
 - It is equal to long-run marginal cost.
 - The long-run average cost curve is tangent to the lowest point on a short-run average total cost curve.
 - It is equal to the short-run marginal cost curve for that level of output.
 - All of the above occur.
11. The responsiveness or sensitivity of a firm's profits to changes in output is measured by a firm's:
- Operating leverage.
 - Contribution margin per unit.
 - Degree of operating leverage.
 - Returns to scale.
 - Price elasticity of demand.
12. A monopolist faces a demand function $Q = 10 - P/10$ and has constant unit cost equal to 40. His total revenue at the profit maximizing Price/Output combination will be:
- 120.
 - 150.
 - 180.
 - 210.
 - 240.
13. Which of the following is a characteristic of both monopolistic competition and monopoly:
- Firms face significant barriers to entry.
 - A firm's marginal revenue lies below its demand curve.
 - In the long-run, a firm will earn zero economic profit.
 - In the long-run, a firm will produce an output that corresponds to the minimum of its average total cost curve.
 - Each faces inelastic demands for their output.
14. A **natural monopoly** refers to a monopoly that arises because of:
- Economies of scale over a broad range of output.
 - The need to conserve natural resources.
 - A government franchise to create a nature preserve.
 - Control over a natural input.
 - A patent or copyright.
15. Two firms that comprise an industry have decided to collude and behave as a monopolist in order to maximize their total collective profit. How should they behave?
- Both firms should increase their levels of output equally.
 - The firm with the higher marginal cost should reduce output and the firm with the lower marginal cost should increase output.

- c. The firm with the lower marginal cost should reduce output and the firm with the higher marginal cost should increase output.
 - d. Both firms should reduce their levels of output.
 - e. Each should equate its marginal cost with its marginal revenue.
16. In a two-player game, which of the following is a **NASH** equilibrium?
- a. Each player chooses a strategy that is optimal given the other's choice.
 - b. The quantity supplied by one player is equal to the quantity demanded by the other player.
 - c. The two players cooperate in planning their strategies.
 - d. Both players end up with excess capacity.
 - e. The players behave as duopolists in an oligopoly.
17. In an oligopolistic market, a firm may decide to increase its scale so that it has excess production capacity because doing so enables it to
- a. Minimize its average cost of production.
 - b. Establish a credible deterrent to the entry of competing firms.
 - c. Broaden its product line.
 - d. Take fuller advantage of its dominant strategy.
 - e. Be ready for an expected expansion in overall demand.
18. A firm produces two products (A and B) jointly. Every time a unit of A is produced, a unit of B is produced also. At the current level of output, the marginal revenue from sales of A is 25 and from sales of B is 15. The marginal cost of producing a unit of A is 40. The firm should:
- a. Continue producing the current level of output.
 - b. Increase its rate of production.
 - c. Reduce its rate of production.
 - d. Raise its sales prices.
 - e. Get out of the business.
19. A firm practices first-degree price discrimination. The demand for its product is given by $Q_d = 20 - 2P$. If the firm maximizes profit by selling 4 units of output, and the product is infinitely divisible, what is the firm's total revenue?
- a. 32.
 - b. 36.
 - c. 40.
 - d. 44.
 - e. 48.
20. The optimal combination of joint products that are produced in variable proportions is found where:
- a. The marginal revenue from each product is equal to the marginal cost of each.
 - b. The isorevenue line is tangent to the transformation curve.
 - c. The isorevenue line is tangent to the relevant cost curve.
 - d. All of the above are correct.
 - e. Both a and b.

II. **TRUE or FALSE (20 points total).** Label your answers to the following 10 statements with either a T or an F and briefly justify your answer. (Each answer is worth a maximum of 2 points: 1 point for accuracy of answer and 1 point for the justification provided).

1. The price elasticity of demand is the same as the slope of a demand curve.
2. Heteroscedasticity refers to a violation of the assumption that the mean of the error terms is zero.
3. The use of a linear trend equation to forecast future values of a variable is based on the assumption of a constant amount of change per time period.
4. If a firm is experiencing increasing returns to scale, then a doubling of output will require more than a doubling of inputs.
5. The minimum short-run average total cost occurs at a level of output that is greater than that at which average variable cost is at a minimum.
6. The supply curve of a perfectly competitive firm is identical to the portion of its marginal cost curve that is above its average total cost curve.
7. A profit-maximizing monopolist will never produce a quantity that corresponds to a point on the inelastic portion of his demand curve.
8. The dominant-firm price leadership model describes a market structure in which the dominant firm is the price maker and all other firms are price takers.
9. Dumping occurs when a firm charges a higher price for a product on foreign markets than in its domestic market.
10. Under cost-plus pricing, the more elastic the demand is for a product, the higher should be the markup.

PROBLEMS – 60 points total for problems III, IV, V, and VI

III. **15 points for correctly answering parts a, b, c, d, and e.** A market has only two sellers (Firm A and Firm B) who are trying to decide on a pricing strategy. If both firms charge a high price, then each will experience a 10% increase in profits. If both charge a low price, then each will experience a 5% decrease in profits. If Firm A charges a low price while the other charges a high price, then Firm A will experience a 6% increase in profits while its competitor will experience a 2% decrease in profits. If Firm B charges a low price while its competitor charges a high price, then Firm B will experience a 7% increase in profits while its competitor will experience a 3% decrease in profits.

- a. **For 3 points.** Construct a payoff matrix of the outcomes.
- b. **For 3 points.** Determine whether each of the firms has a dominant strategy and, if it does, identify the strategy.
- c. **For 3 points.** Determine the optimal strategy for each firm.
- d. **For 3 points.** Determine the NASH equilibrium.
- e. **For 3 points.** Is this a prisoners' dilemma situation? What is your reasoning?

- IV. **15 points for correctly answering parts a, b, and c.** Best Product, Inc., is a monopolist. It has estimated the demand function for its product at:

$$Q = 60 - 0.4 P + 6 M + 2 A$$

Where Q = quantity of units sold; P = price per unit; M = per capita disposable income (in thousands); and A = advertising expenditures (in hundreds).

Best Product's average variable cost function is:

$$AVC = Q^2 - 10 Q + 60$$

Assuming $M = 3$ (thousand) and $A = 3$ (hundred) for the period under consideration and that Total Fixed Costs = 1000:

- For 6 points.** Derive the Marginal Cost and Marginal Revenue functions.
 - For 6 points.** Calculate the profit-maximizing price and output levels for Best Product. What would total profits be at the maximizing price/output combination?
 - For 3 points.** If Total Fixed Costs were 1200, what would be the profit-maximizing price/output combination and what would total profits be?
- V. **15 points for correctly answering parts a, b, and c.** A hotel caters to both business and vacation travelers. Demand for hotel accommodations by business travelers is estimated at: $D_b = 1600 - 80P$, while demand by vacation travelers is estimated at: $D_v = 2400 - 100P$
- The hotel's marginal cost is estimated at: $MC = 4.5 + 0.005Q$
- For 5 points.** If the hotel's capacity is 1280 rooms and management seeks to achieve 100% occupancy, how many rooms should be allocated to each of the two categories of guests in order to maximize **Total Revenue from room rentals**?
 - For 5 points.** Given the hotel's cost structure, how many rooms should be allocated to each category of hotel guests in order to maximize **Total Profits**?
 - For 5 points.** What room rental prices should be charged for rooms rented to business travelers and vacation travelers in order to maximize hotel profits?
- VI. **15 points for correctly answering parts a, b, and c.** Consider the following short-run production function:

$$Q = 6 L^2 - 0.4 L^3,$$

Where Q = output, and L represents the variable input, Labor.

- a. **For 5 points.** Determine the functions for the marginal product of labor and the average product for labor.
- b. **For 5 points.** At which levels of labor utilization is output (1) minimized and (2) maximized?
- c. **For 5 points.** At which levels of labor utilization is (1) marginal product maximized, and (2) average product maximized?