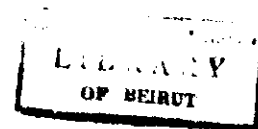


AMERICAN UNIVERSITY of BEIRUT  
SCHOOL of BUSINESS  
BUSS. 230  
FINAL EXAM  
Monday, June 24, 2002



NAME: \_\_\_\_\_

ID: \_\_\_\_\_

SECTION: \_\_\_\_\_

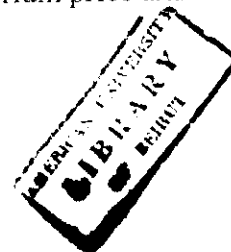
INSTRUCTOR: \_\_\_\_\_

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. Which of the following is **NOT** one of the features characterizing market structures:
  - a. The number and size of firms.
  - b. The likelihood of new firms entering a market.
  - c. The level of investment in research and development.
  - d. The degree of product differentiation.
  - e. The extent of interdependence between firms.
  
2. Given the following demand and supply functions:  
 $Q_d = 900 - 60P$  and  $Q_s = -200 + 50P$ , the equilibrium price and output would be:
  - a.  $P = 7$ , and  $Q = 480$ .
  - b.  $P = 10$ , and  $Q = 300$ .
  - c.  $P = 20$ , and  $Q = 150$ .
  - d.  $P = 100$ , and  $Q = 5,300$ .
  - e. None of the above.
  
3. The demand for good X will be more elastic than the demand for good Y when:
  - a. Good X has fewer substitutes than good Y.
  - b. Expenditure on good X accounts for a larger proportion of a typical consumer's budget than expenditure on good Y.
  - c. Consumers have more time to adjust to a change in the price of good X than they have time to adjust to a change in the price of good Y.
  - d. Both a and b.
  - e. Both b and c.
  
4. Whenever the additional revenue from the last unit of output exceeds the additional cost of that unit, a profit-maximizing firm should:
  - a. Do nothing; the firm is making enough profits.
  - b. Produce less in order to raise price and profits.
  - c. Produce more in order to increase profits.
  - d. Contemplate investing in another industry.
  - e. None of the above.



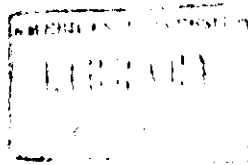


5. An estimator is unbiased if it produces:
- A parameter from the sample that equals the true parameter.
  - Estimates of the parameter that are close to the true parameter.
  - Estimates of the parameter that are statistically significant.
  - Estimates of the parameter that are *on average* equal to the true parameter.
  - All of the above.
6. A consulting firm wishes to estimate the demand for coal used in electricity generating plants. The firm has information on the following variables for the past 20 years: coal consumption, real price of coal, consumers' income, and the real price of oil. Which of the following statements is correct?
- There are not enough exogenous variables in the demand function.
  - The demand function is identified.
  - The demand function is not identified.
  - The demand for coal depends only on the price of coal.
  - Both a and b.
7. A forecaster used the following regression equation  $Q_t = a + bT + c_1D_1 + c_2D_2 + c_3D_3$  and quarterly sales data for the period 1982Q1 through 1998Q4 ( $T = 1, \dots, 64$ ) for an appliance manufacturer to obtain the results shown below.  $Q$  is quarterly sales, and  $D_1$ ,  $D_2$ , and  $D_3$  are dummy variables for quarters I, II, and III, respectively.

Dependent Variable ( $Q_t$ )		R-SQUARE	F-Ratio	P-on F
Observations	64	0.8768	107.982	0.0001
VARIABLE	PARAMETER ESTIMATE	STANDARD ERROR	T-Ratio	
INTERCEPT	30.0	12.8	2.34	
T	1.5	0.7	2.14	
D1	10.0	3.0	3.33	
D2	25.0	7.2	3.47	
D3	40.0	15.8	2.53	

At the 5 percent level of significance, is there a statistically significant trend in sales?

- No, because  $1.5 < 2.66$ .
- No, because  $1.5 < 2.0$ .
- No, because  $2.14 < 2.66$ .
- Yes, because  $2.14 > 2.0$ .
- None of the above.



8. Using the estimation results indicated in the previous question, the predicted level of sales in the first quarter of 1999 is \_\_\_\_\_ units :
- 127.5
  - 137.5
  - 162.5.
  - 202.5.
  - None of the above.
9. If the Marginal Product is decreasing, then it must be the case that:
- Average Product is decreasing.
  - Average Product is greater than Marginal Product.
  - Average Product is less than Marginal Product.
  - Total Product is decreasing.
  - None of the above.
10. The implicit cost of using an input
- Is measured by the amount paid for using the input.
  - Is the value of the input in its best alternative use.
  - Has no bearing on short-run input decisions.
  - Both a and c.
  - Both b and c.
11. Which of the following is **FALSE** ?
- A change in input prices shifts the isoquant map.
  - Convex isoquants mean that the Marginal Rate of Technical Substitution decreases as the firm substitutes labor for capital.
  - A change in costs shifts the isocost curve.
  - At the optimal input choice, the rate at which the firm can substitute labor for capital in production is equal to the rate at which the firm can substitute labor for capital in the market.
  - None of the above is false.
12. Which of the following are characteristics of a typical isoquant?
- All input combinations on the isoquant will produce the same level of output.
  - The Marginal Rate of Technical Substitution decreases as labor is substituted for capital.
  - A change in input prices shifts the isoquant map.
  - Both a and b.
  - None of the above.
13. What is a problem with using a production function of the form  $Q = aK + bL$  ( $a > 0, b > 0$ )
- The Marginal Rate of Technical Substitution is constant.
  - A positive output can be obtained when only one input is used.
  - The Marginal Products of both inputs do not exhibit diminishing returns.
  - Both a and b.
  - All of the above.



14. A firm estimated its short-run costs using an average variable cost function of the form :  $AVC = a + bQ + cQ^2$  and obtained the following results. Total fixed cost is 1,000.

Dependent variable: AVC	R-SQUARE	F-RATIO	P-on F
Observations: 35	0.8713	108.3	0.0001

VARIABLE	PARAMETER ESTIMATE	STANDARD ERROR	T-RATIO	P-VALUE
INTERCEPT	43.40	13.80	3.14	0.0036
Q	-2.80	0.90	-3.11	0.0039
Q <sup>2</sup>	0.20	0.05	4.00	0.0004

The estimated Marginal Cost function is:

- $MC = 43.4 Q - 1.4 Q^2 + 0.02 Q^3$
  - $MC = 43.4 - 1.4 Q + 0.06 Q^2$
  - $MC = 43.4 Q - 5.6 Q^2 + 0.6 Q^3$
  - $MC = 43.4 - 5.6 Q + 0.6 Q^2$
  - $MC = 43.4 - 2.8 Q + 0.2 Q^2$
15. Suppose that a perfectly competitive industry is in long-run equilibrium. Then, the price of a complementary good decreases. What will happen?
- Next period a typical firm will increase output.
  - Next period a typical firm will earn a greater than normal rate of return on investment.
  - Both a and b.
  - Nothing since the industry is in long-run equilibrium.
  - Some firms will make losses and exit the industry.
16. The Nice & Clean Company, a housecleaning firm, had total revenues last year of 100,000. Payments for wages, rent, and supplies amounted to 91,000. The owner, who does not manage the firm, has invested 60,000 in the firm and could have earned 15% on that investment by buying government Bonds. What is the firm's economic profit?
- 0.
  - 3,000.
  - 6,000.
  - 9,000.
  - 18,000.
17. Monopolistic competition is similar to perfect competition in that:
- There are a large number of firms.
  - Firms earn economic profits in the long run.
  - Firms face downward-sloping demand curves.
  - Firms have constant long-run costs.
  - All of the above.

18. If a monopolist is producing a level of output at which demand is inelastic; then:
- The firm is not maximizing profit.
  - Marginal revenue is positive.
  - Total revenue will decrease if the firm decreases output.
  - Total revenue will increase if the firm increases output.
  - All of the above.
19. Oligopolists recognize their mutual interdependence because:
- There are few firms in the market.
  - Firms produce differentiated products.
  - Total industry sales are large.
  - There are barriers to entering the market.
  - All of the above.
20. In the analytical framework of Game Theory, a dominant strategy is:
- A strategy used by large firms to dominate small firms.
  - A strategy followed by the biggest firm in the industry.
  - A strategy involving high risk but also high return.
  - A strategy that leads to the best outcome no matter what strategy is followed by rival firms.
  - A strategy that is illegal because it is anticompetitive.

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).

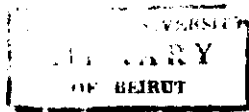
- If the marginal benefit of increasing the time devoted to studying exceeds the marginal cost, then a maximizing student would decrease the number of hours devoted to studying.
- Time trend forecasting models use dummy variables to take into account random variations in observations.
- The law of diminishing returns refers to falling Marginal Product as utilization of all inputs increases.
- An expansion path traces the changes in input prices as a producer's output level changes.
- In estimating a short-run production function, the following cubic form is considered most appropriate:  $Q = a + bL + cL^2 + dL^3$ .
- If production elasticity exceeds 1, then the Marginal Product of the variable input must exceed the Average Product of the variable input.
- The more easily substitutable are Labor and Capital, the more convex the production isoquants would be.
- In the long-run, firms in perfectly competitive markets and those in monopolistic competition markets operate at the lowest point of the Average Cost curve.
- If the price elasticity of demand facing a monopolist is  $-1.50$  and his Marginal Cost is 10, then the optimal price charged by the monopolist would be  $P = 30$ .
- One of the reasons for regulating "public utility" monopolies is to allow the monopolist to capture the element of increasing returns to scale thereby lowering the cost of the service to the community.

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

- III. **15 points for correctly answering parts a and b.** A manager estimated his firm's long-run production function as:  
 $Q = 3 \cdot L^{0.50} \cdot K^{0.75}$ . (3 multiplied by L raised to the power 0.50 multiplied by K raised to the power 0.75).  
 The unit costs of inputs are  $L = 10$  and  $K = 20$ .  
 The firm's budget for input use is 5 million.
- a. **For 10 points.** Calculate the optimal levels of L and K to produce the most output for the given budget constraint.
  - b. **For 5 points.** What would be the level of output corresponding to the optimal L and K.
- IV. **15 points for correctly answering parts a, b, and c.** A farmer is contemplating how much wheat to grow on his land. He has determined that his Average Variable Cost (AVC) has the following functional form:  
 $AVC = 1,000 - 0.03 Q + 0.00005 Q^2$ . Total fixed costs are 6,000.
- a. **For 5 points.** What would be his profit maximizing output if the market price for wheat were 1000/ton?
  - b. **For 5 points.** Calculate the resulting total profits.
  - c. **For 5 points.** Suppose the market price was 900/ton instead of 1000/ton, how would the farmer adjust to that price?
- V. **15 points for correctly answering parts a, b, and c.** A bedroom furniture manufacturing company has estimated the following demand function for its beds:  $P = 1760 - 12Q$   
 The company's accounting department has estimated the Total Cost function for beds as:  $TC = \frac{1}{3} Q^3 - 15Q^2 + 5Q + 24,000$
- a. **For 5 points.** Calculate the level of production that maximizes short-run profits.
  - b. **For 5 points.** Calculate the profit-maximizing price. What would total profits be at the maximizing price/output combination?
  - c. **For 5 points.** Calculate the point elasticity of demand at the profit maximizing level of output.
- VI. **15 points for correctly answering parts a, b, and c.** Middle East Airlines (M) and Egypt Air (E) compete head-to-head on Beirut-Cairo flights and are the only airlines offering non-stop flights between the two cities. Assume that they have determined the demand functions for their services to be as follows:
- $$Q_M = 4,000 - 25P_M + 12P_E$$
- $$Q_E = 3,000 - 20P_E + 10P_M$$
- Where  $Q_M$  and  $Q_E$  are the total numbers of round-trip tickets sold in one week and  $P_M$  and  $P_E$  are the respective prices charged by the two airlines.

Assume further that both airlines operate under constant costs, and that the respective costs are 160/ticket for Middle East Airlines and 180/ticket for Egypt Air. Assume that the cost differences reflect some difference in the services offered on board the planes.

- a. **For 5 points.** Derive the equations for the Best Response Curves of each of the two airlines?
- b. **For 5 points.** What are the mutually best prices that each airline will charge for the round-trip ticket?
- c. **For 5 points.** How many round-trip tickets a week will each airline sell?



Critical t-Values	Degrees of freedom	Significance level			
		0.10	0.05	0.02	0.01
	1	6.314	12.706	31.821	63.657
	2	2.920	4.303	6.965	9.925
	3	2.353	3.182	4.541	5.841
	4	2.132	2.776	3.747	4.604
	5	2.015	2.571	3.365	4.032
	6	1.943	2.447	3.143	3.707
	7	1.895	2.365	2.998	3.499
	8	1.860	2.306	2.896	3.355
	9	1.833	2.262	2.821	3.250
	10	1.812	2.228	2.764	3.169
	11	1.796	2.201	2.718	3.106
	12	1.782	2.179	2.681	3.055
	13	1.771	2.160	2.650	3.012
	14	1.761	2.145	2.624	2.977
	15	1.753	2.131	2.602	2.947
	16	1.746	2.120	2.583	2.921
	17	1.740	2.110	2.567	2.898
	18	1.734	2.101	2.552	2.878
	19	1.729	2.093	2.539	2.861
	20	1.725	2.086	2.528	2.845
	21	1.721	2.080	2.518	2.831
	22	1.717	2.074	2.508	2.819
	23	1.714	2.069	2.500	2.807
	24	1.711	2.064	2.492	2.797
	25	1.708	2.060	2.485	2.787
	26	1.706	2.056	2.479	2.779
	27	1.703	2.052	2.473	2.771
	28	1.701	2.048	2.467	2.763
	29	1.699	2.045	2.462	2.755
	30	1.697	2.042	2.457	2.750
	40	1.684	2.021	2.423	2.704
	60	1.671	2.000	2.390	2.660
	120	1.658	1.980	2.358	2.617
	$\infty$	1.645	1.960	2.326	2.576

Source: Adapted with permission from R. J. Wonnacott and T. H. Wonnacott, *Econometrics*, 2d ed., New York: John Wiley & Sons, 1979.