

AMERICAN UNIVERSITY of BEIRUT
SCHOOL of BUSINESS
BUSS. 230
Mid-Term EXAM
Monday, April 15, 2002

NAME: _____

ID: _____

SECTION: _____

INSTRUCTOR: _____

ANSWER ALL QUESTIONS. TOTAL TIME ALLOWED: 1 1/2 hours

I. **Multiple choice (30 points total).** Circle the correct answer in each of the following 15 questions – (2 point for each correct answer)

1. Which of the following statements is false?
 - a. Normal profit is the opportunity cost of the owner's resources.
 - b. When economic profit is zero, firms earn just a normal profit.
 - c. If economic profit is positive, accounting profit must also be positive.
 - d. If economic profit is negative, accounting profit must also be negative.
 - e. None of the above is false.
2. A manager who does not see his/her goal as the maximization of profit:
 - a. May nevertheless maximize the value of the firm.
 - b. Represents a principal-agent problem.
 - c. Will likely be replaced either by shareholders or by a takeover of the firm.
 - d. Both a and b.
 - e. Both b and c.
3. Which of the following events would increase the supply of wheat?
 - a. An increase in the price of pesticides.
 - b. A decrease in the demand for wheat.
 - c. A fall in the price of wheat.
 - d. A severe drought in wheat growing areas.
 - e. A decrease in the price of corn.
4. Using the linear demand relation $Q_d = 680 - 9P + 0.006M - 4Pr$, where M is income and Pr the price of a related good, r.
 - a. The good is an inferior good.
 - b. The good is a substitute for good r.
 - c. The good is a complement to good r.
 - d. The good is both an inferior good and a substitute to good r.
 - e. The good is both an inferior good and a complement to good r.

5. With a given supply curve, a decrease in demand leads to:
- A decrease in equilibrium price and an increase in equilibrium quantity.
 - An increase in equilibrium price and a decrease in equilibrium quantity.
 - A decrease in equilibrium price and a decrease in equilibrium quantity.
 - No change in price and a decrease in equilibrium quantity.
 - An increase in equilibrium price and no change in equilibrium quantity.
6. If the demand for umbrellas is price inelastic,
- Changes in price do not affect the number of umbrellas demanded.
 - If more umbrellas are sold as a result of a price decrease, total expenditures by consumers on umbrellas will decrease.
 - The percentage change in price is less than the percentage change in quantity demanded.
 - The percentage change in quantity demanded is greater than the percentage change in price.
 - None of the above.
7. If the price elasticity of video cassette recorders (VCRs) is -1.3 and price of VCRs increases by 20%, what happens to the quantity of VCRs demanded?
- Quantity decreases by 26%.
 - Quantity decreases by 6.5%.
 - Quantity increases by 15%.
 - Quantity increases by 21.3%.
 - Quantity decreases by 21.3%.
8. Perfume industry statistics show that over a 5-year period, the number of bottles of perfume sold decreased by 30%, but the total expenditures by consumers on perfume was unchanged. This means that:
- Consumers were unresponsive to changes in price and the percentage change in quantity demanded was less than the percentage change in price.
 - Demand for perfume was elastic.
 - Demand for perfume had unitary elasticity.
 - Demand for perfume was inelastic.
 - Demand for perfume had zero elasticity.
9. In deciding whether to increase its advertising budget, the firm management should **NOT** consider:
- The added revenue from increased sales.
 - The added cost of producing more goods for sale.
 - Interest payments on borrowing by the firm.
 - The cost of increased advertising.
 - The different media to be used in advertising.

10. In order to minimize the **NET** cost of theft, a firm should choose the level of theft prevention at which:
- Theft is eliminated.
 - The marginal benefit of theft prevention equals the marginal cost of preventing theft.
 - Benefit of theft prevention equals total cost of theft prevention.
 - The marginal benefit of theft equals the marginal cost of theft.
 - The total cost of theft prevention equals the marginal cost of preventing theft.
11. In using regression analysis, the objective is to:
- Estimate the parameters a and b.
 - Estimate the variables Y and X.
 - Fit a straight line through the scatter data in such a way that the errors are minimized.
 - Both a and b.
 - Both a and c.
12. The critical value of "t" is the value the t-statistic must exceed to:
- Reject hypothesis that the true value of a parameter equals zero.
 - Accept the hypothesis that the parameter equals zero.
 - Accept the hypothesis that the estimated value of the parameter equals the true value.
 - Reject the hypothesis that that the estimated value of the parameter equals the true value.
 - Reject the hypothesis that the estimated value of the parameter exceeds the true value.
13. If the chosen level of significance is 5%, the
- Probability of getting statistical significance when the true value of the parameter is zero is 5%.
 - Probability of not finding statistical significance when the true value of the parameter is zero is 95%.
 - Level of confidence is 95%.
 - Both a and b.
 - All of the above.
14. In estimating demand, problems with consumer interviews include:
- A nonrandom sample of interviewees.
 - Identification of the true underlying population.
 - Response bias.
 - Both a and c.
 - Both b and c.
15. A demand function is said to be identified if:
- The supply function contains at least one endogenous variable that is not in the demand function.
 - The supply function contains at least one exogenous variable that is not in the demand function.
 - The demand function contains at least one endogenous variable that is not in the supply function.
 - The demand function contains at least one exogenous variable that is not in the supply function.
 - Both demand and supply functions contains only endogenous variables.

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. In an unconstrained maximization situation, cutting back on an activity will increase net benefit if the starting position was one where the marginal benefit was equal to the marginal cost.
2. If the first order condition is satisfied, then the solution to an optimization problem is a maximum.
3. Assuming that company profits and interest rates rise during periods of high growth of economic activity, it follows that the values of companies must rise also during such periods.
4. The principal-agent problem is a feature that characterizes the operations of every modern company.
5. Multicollinearity in a regression refers to a situation where all the error terms in the regression are linearly related.
6. Following publication of a study concluding that individuals whose diet is rich in yoghurt have increased life expectancy, one would expect the price of veal to rise.
7. For the exponential demand function $Q_d = a.P^b.M^c.Pr^d$, the estimated cross-price elasticity of demand is b.
8. When Marginal Revenue is positive, decreasing a good's price will cause total revenues to increase.
9. The t-test is employed to ascertain whether the overall regression equation is statistically significant.
10. In the demand-supply system: $Q_d = a + bP + cM$ and $Q_s = d + eP$, the demand function is identified while the supply function is not.

PROBLEMS – 50 points total for problems III, IV, and V

III. **15 points for correctly answering parts a, b, and c.** Defining Q to be the level of output produced and sold by a firm, and assuming that the firm's cost function is: **Total cost = 20 + 5Q + Q²**, while the demand for the output of the firm is given by the relationship $Q = 25 - P$

- a. **For 5 points.** Determine the output level that maximizes total profits.
- b. **For 5 points.** Calculate total profits and selling price at the profit-maximizing output level.
- c. **For 5 points.** If fixed costs increased from 20 to 25 in the total cost relationship, determine the effects of such an increase on both the profit-maximizing output level and total profits.

IV. **15 points for correctly answering parts a, b, and c.** The demand schedule for good X is as follows:

Quantity	Price
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<u>(Units)</u>	<u>(\$/unit)</u>
200	11
400	10
600	9
800	8
1000	7
1200	6
1400	5
1600	4
1800	3
2000	2
2200	1

- For 5 points.** Derive the equation of the implied demand function and the equation of the implied marginal revenue function.
- For 5 points.** At what price is demand unitary elastic?
- For 5 points.** At what level of output is marginal revenue zero?

V. **20 points for correctly answering parts a, b, and c.** Following are the key results of a linear regression relating Sales by a company to various variables:

$$Y = 310.245 + 0.008 A - 12.202 P + 2.677 M$$

Dependent variable (Y): SALES

N = 10

	<u>coefficient</u>	<u>Se</u>
Intercept	310.245	95.075
Advertising (A)	0.008	0.204
Price	-12.202	4.582
Income (M)	2.677	3.160

Regression sum of squares: 6829.866

Residual sum of squares: 1820.134

- For 9 points.** Which of the independent variables is statistically significant at the 5% level?
- For 6 points.** What proportion of the total variation in sales is explained by the regression? What proportion is not explained?
- For 5 points.** Perform an F-test at the 0.05 level of the overall explanatory power of the model.

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	2.719	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	2.756
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
∞	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.

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