

Examination: 5016

## **Principles of Economics I**

**Winter Semester 2006 / 2007**

**Dr. John E. Brennan**

You are allowed to use a non-programmable calculator (in accordance with the instructions given by the examination office) and a translating dictionary from your native language to English (without any notes written into it). **All** of the **twelve** (12) exam questions must be answered (the estimated time to spend on each question is provided). This examination consists of **four** (4) pages and must be completed within 120 minutes.

### **Question 1 (10 Minutes)**

In economics, Total Utility,  $U = f(A, B)$ , denotes the level of satisfaction, happiness, gladness, etc., that comes from consumption of two goods, A and B. It is thought to increase with the quantity of the goods consumed:  $\partial U / \partial A > 0$  and  $\partial U / \partial B > 0$ .

- (a) Considering only one good, A, explain the “Law of Diminishing Marginal Utility”.
- (b) If two goods, A and B, are being considered, explain the “Equi-Marginal Principle” in the context of the situation where  $MU_A / P_A > MU_B / P_B$  after the Consumption Budget, M, has all been spent.

### **Question 2 (10 Minutes)**

A century ago, Vilfredo Pareto (1848 – 1923) developed what are now called indifference curves.

- (a) What is the difference between Cardinal Utility and Ordinal Utility?
- (b) Explain how an indifference curve is drawn using a Total Utility function,  $U = f(A, B)$ , where two goods are considered, A and B. Why do the indifference curves slope downwards?
- (c) What is the Marginal Rate of Substitution (MRS) and what does it measure?

### **Question 3 (10 Minutes)**

The great economist Alfred Marshall (1842 – 1924) postulated the Law of Demand. Utilizing the following demand function for product x:

$$Q_x^d = f(p_x) = 5.2 - 2.1 p_x^{0.6}$$

- (a) Calculate the Price Elasticity of Demand when  $p_x = € 3.0$  and explain whether or not this price would yield the maximum revenue.
- (b) In order to increase total revenue, this company should increase or decrease the selling price,  $p_x$ ? Explain under what conditions the opposite is true.
- (c) If the Cross Price Elasticity of Demand for product x is calculated using the price of product y,  $p_y$ , the result ( $E = 1.68$ ) tells us what about the relationship between product x and product y?

**Please turn to Page 2**

**Question 4 (10 Minutes)**

Market equilibrium occurs at the equilibrium price where the quantity demanded equals the quantity supplied,  $Q^d_x = Q^s_x$ .

- Describe the situation that would prevail in a market if the price were to be fixed by the government below the free market equilibrium price. Show your analysis on a graph.
- When there is a decrease in demand in a market and the supply curve remains unchanged, what happens to the equilibrium price and quantity? Show your analysis on a graph.
- What do we mean by the term: The "Comparative Statics Analysis" of markets? How does comparative statics differ from a dynamic analysis?

**Question 5 (10 Minutes)**

Consider a monopolist with a Cobb-Douglas production function that produces and sells  $Q^s_x$  units of product x per time period:

$$Q^s_x = \tau L^{0.417} K^{0.317} M^{0.186} \text{ with } \bar{\tau} = 1.1, \bar{K} = 1500, \text{ and } \bar{M} = 300$$

The market demand curve for product x is:

$$p_x = 40 - 0.17645 Q^s_x \text{ where } p_x \text{ is the market price in } \text{€} / \text{unit}$$

Labor	$Q_x$	$MP_L$	$p_x$	TR	MR	$MRP_L$
12	90.98646	3.242155	23.94544	2178.711	8.462958	27.43822
13	94.07464	3.08818	23.40053	2201.396	7.34597	22.68568
14	97.02721	2.952578	22.87955	2219.939	6.280079	18.54242
15	99.85923	2.832019	22.37984	2234.833	5.259387	14.89468
16	102.5832	2.723958	21.8992	2246.489	4.279035	11.65591
17	105.2096	2.62641	21.43577	2255.248	3.334962	8.758977

- Explain the statement: "Factor demands are derived demands"
- If the wage rate were € 13.00 per time period, how many units of Labor would this company employ?
- If this company were to employ 12 units of Labor, what is the Average Product of Labor ( $AP_L$ )? Is the  $AP_L$  increasing or decreasing over the range of Labor usages shown in the table above? Based on your answer, should the  $MP_L$  be a bigger or smaller number and why?
- Considering the Cobb-Douglas production function used in this problem, what kind of Returns to Scale does it have?

**Question 6 (10 Minutes)**

The production function,  $Q^s_x = \tau f(K, L, M)$ , specifies maximum production output.

- What is the definition of the MRTS?
- How do we draw an isoquant with K and L on the two axes? What does it represent and how do we find the least cost combinations of these two inputs to use in production?

**Question 7 (10 Minutes)**

In the short run, if the price of a firm's product in a perfectly competitive industry is less than:

- The minimum average total cost, the firm will consider its options and will consider?
- The minimum average variable cost, the firm will consider doing?

**Question 8 (10 Minutes)**

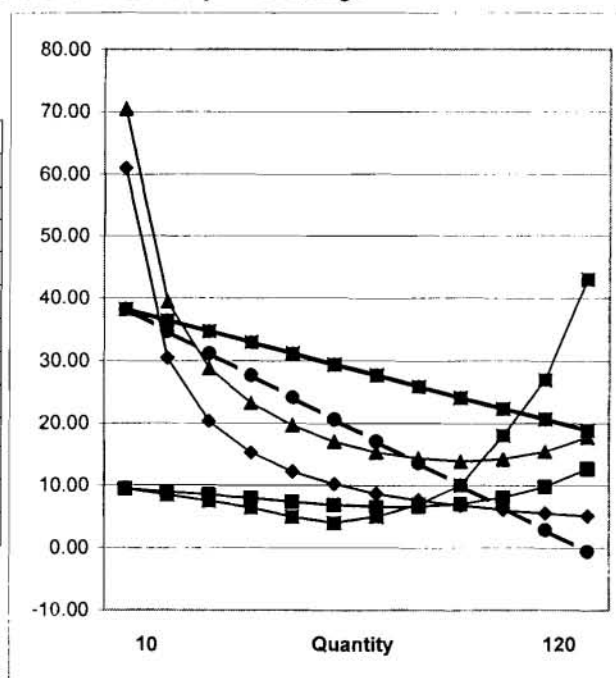
Consider all the following cost curves: ATC, AFC, AVC, and MC.

- Explain why these cost curves are all U-shaped except one? Which one is not?
- Explain the relationship between the ATC and AVC curves and MC.
- Why is it sometimes said that the AFC curve is not very interesting?

**Question 9 (10 Minutes)**

Consider the following monopolist:

Q	AFC	AVC	ATC	MC	Price	MR
10	61.00	9.50	70.50	9.50	38.24	38.24
20	30.50	9.00	39.50	8.50	36.47	34.71
30	20.33	8.50	28.83	7.50	34.71	31.18
40	15.25	8.00	23.25	6.50	32.94	27.65
50	12.20	7.40	19.60	5.00	31.18	24.12
60	10.17	6.83	17.00	4.00	29.41	20.59
70	8.71	6.57	15.29	5.00	27.65	17.06
80	7.63	6.63	14.25	7.00	25.88	13.53
90	6.78	7.00	13.78	10.00	24.12	10.00
100	6.10	8.10	14.20	18.00	22.36	6.47
110	5.55	9.82	15.36	27.00	20.59	2.95
120	5.08	12.58	17.67	43.00	18.83	-0.58



- What price would this profit maximizing monopolist charge for its product?
- Calculate the Total Profit earned by this monopolist.
- Is the Elasticity of Demand elastic or inelastic at the profit-maximizing price?

**Question 10 (10 Minutes)**

Consider the following Income Elasticities for products A, B, and C:

Product	Income Elasticity
A	1.44
B	0.67
C	-0.36

- What kind of product is B and how would the purchases of this product be affected by an increase in income? Give an example of such a product.
- Give an example of a product like product C

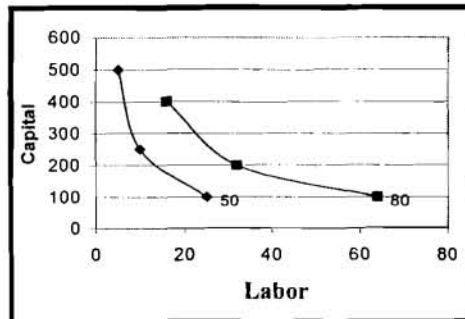
**Question 11 (10 Minutes)**

In order to determine the output levels,  $Q$ , just substitute the amount of labor ( $L$ ) and capital ( $K$ ) into the production function formula given below.

For example, when  $L = 5$  and  $K = 500$  we get:

$$Q = \sqrt{LK} = \sqrt{(5)(500)} = \sqrt{2500} = 50$$

Labor (L)	Capital (K)	Output (Q)
5	500	50
10	250	50
25	100	50
16	400	80
32	200	80
64	100	80



- What is the MRTS for  $Q = 50$  between  $L = 10$  and  $25$ ?
- Does this production function have increasing, decreasing, or constant returns to scale?
- Does this production function have diminishing returns to labor? Demonstrate.

**Question 12 (10 Minutes)**

Answer the following questions.

- Explain the difference between Perfect Competition and Monopolistic Competition.
- Give three examples of Barriers to Entry that can limit the number of producers in a particular market.
- What is the today's Present Value (PV) of € 22,800.00 (FV) that will be available only at the end of five years when the rate of return is 14%?

**This is the end of the examination.**

**GOOD LUCK !!**