UGANDA MARTYRS UNIVERSITY

NKOZI

UNIVERSITY EXAMINATIONS

FACULTY OF BUSINESS ADMINISTRATION

ADVANCED MICROECONOMICS EXAMINATION 2023

MDE 5102

DATE:

DURATION: **Three (03) Hours**

Instructions:

1. Attempt any **FOUR (04)** questions
2. All questions carry equal marks
3. Do not write anything on the questions paper.
4. Carefully read through ALL the questions before attempting.
5. No **names** should be written anywhere on the examination booklet.
6. Ensure your work is **clear** and **readable**. Untidy work shall be penalized.
7. Any type of examination Malpractice will lead to automatic disqualification.
8. Ensure that your **ID number** is indicated on all pages of the examination answer booklet.
9. **Mobile phones are not allowed in the exam room.**

Question One

a) The Ministry of Education and Sports estimated the demand for university education (number of students) in Uganda as $Q_d = 3600 - 4P$ and $Q_s = 12P - 1200$ respectively, where P is the tuition fee per semester (in U.S dollars).

i) Determine the tuition fee per semester and the number of students when the market for University education in an economy is said to be in equilibrium **(4marks)**

ii) If the government increased tuition fee per semester to$P = \$500$,determine the size and nature of the imbalance in the market for university education. What sort of policy has the government applied in this case? **(6marks)**

iii) Using the information in (i) and (ii) above, compute the changes in consumer's and producer's surpluses. **(6marks)**

b) Given the following demand function for beef $Q_b = 4850 - 5P_b + 1.5P_p + 0.1Y$ with $Y = 10{,}000$; $P_b = 200$; $P_p(price\ of\ peas) = 100$.

Calculate:

i) Price Elasticity of demand **(2marks)**

ii) Cross elasticity of demand **(2marks)**

iii) Income elasticity of demand **(2marks)**

c) Explain the factors determining price elasticity of demand **(3marks)**

Question Two

a) Explain the assumptions that distinguish the indirect utility function from expenditure function**(4marks)**

b) The Expenditure minimization problem (EMP) and Utility Maximization problem (UMP) are dual problems. Elaborate **(4marks)**

c) The consumer's utility function is given as $U = (x + 2)(y + 1)$. The prices of the commodities x and y are 4 and 6 respectively. Assume the consumer's budget is 130.

i) Find the optimal levels of commodities x and y **(3marks)**

ii) Find the indirect utility function **(3marks)**

iii) Verify for the Roy's identity**(4marks)**

iv) Verify the Shephard's lemma**(4marks)**

d) Prove that the Hicksian demand function is steeper than the Walrasian demand function for a normal good but the reverse is true in the case of an inferior good **(3marks)**

ii) Derive the elasticity of Substitution between L and K**(4marks)**

iii) Demonstrate that the production function is homogeneous of degree one.**(3marks)**

Question Five

a) Explain the conditions that may lead to successful price discrimination by a monopolist in your country**(7marks)**

b) Suppose a monopoly produces three different products, whose inverse demands are given by the following functions;

$$P_1 = 45 - 4q_1$$

$$P_2 = 29 - 3q_2$$

$$P_3 = 21 - 2q_3$$

Where q_1, q_2 and q_3 are quantities demanded and P_1, P_2 and P_3 are respective prices.

The cost function is $C(Q) = 20 + 5Q + Q^2$ where $Q = q_1 + q_2 + q_3q_3$

i) Write the function of net profits **(3marks)**

ii) Compute the levels of q_1, q_2 and q_3, that maximize profits of the monopolist**(4marks)**

iii) Justify that the amount in (b) above are a global maximum**(3marks)**

c) Distinguish between equilibrium position of a firm under perfect competition and monopoly. Comment on learner index of monopoly in the two market structure **(4marks)**

d) Explain why the perfect competition is described as the ideal model**(4marks)**

Question six

a) Duopolistsface the following market demand curve $q = 30 - p$. Assume$MC_1 = 0$; $FC_1 = FC_2 = 0$. Suppose that the two firms collude and produce a quantity to maximize the total profit. What will be the level of production for each firm? How much profit will each firm make if both firms agree to share profits equally?**(7marks)**

b) Consider two firms whose products are imperfect substitutes. The per period demand for each firm's product depends, in part on the price of that the rival charges for its product.

Question three

a) Briefly explain three "allocation rules" in the theory of allocation of resources. **(3marks)**

b) Suppose that two rice farms A and B have production functions given by $Q = K^{\frac{1}{2}}L^{\frac{1}{2}}$. Farm A is more mechanized that the other. Capital for A is given by $K_A = 200$ and that of B is $K_B = 50$. Labor supply is fixed at 100. Show that there will be quantitative gains in output by applying "allocation rule 2" **(7marks)**

c) Suppose that two goods X and Y are produced using labor only, and their production functions are given by $X = \sqrt{L_X}$ and $Y = \frac{1}{2}\sqrt{L_Y}$ respectively. If Labor supply is fixed at 100, and the community's preferences are represented by: Utility= $U(X,Y) = \sqrt{XY}$

i) Obtain the production possibility frontier **(2marks)**

ii) Calculate the equilibrium output of X and Y**(5marks)**

iii) Calculate the relative prices of X and Y in equilibrium**(5marks)**

iv) Suppose the citizens of this economy were able to trade with the rest of the world at the rate of 4X for one unit of Y. What outputs should they produce in order to take full advantage of this trading opportunity**(3marks)**

Question Four

a) Distinguish between compensating variation and equivalent variation. Which of the two is more relevant for policy and why?**(3marks)**

b) Suppose the consumer is faced with two commodities X and Y and the consumer's utility function is given by $U(X\,Y) = \overline{X\,Y}$. If the consumer's budget is given by $E = P_xX + P_yY$ and the consumer seeks to minimize his expenditure subject to a given level of utility

i) Derive the Hicksian demand function for commodities X and Y**(4marks)**

ii) Obtain the expression for the indirect expenditure function**(3marks)**

iii) Use the Hotellings Lemma to obtain the Hicksian demand functions **(4marks)**

c) Consider the production function $Y = AK^{\beta}L^{1-\beta}$ where $1 > \beta > 0$

i) Derive the demand for L and K for the profit maximizing firm as a function of output and input prices **(4marks)**

Specifically suppose that $q_1 = 8 - 2p_1 + p_2 q_2 = 8 - 22 + p_1$ and that both firms have zero marginal costs

i) What are the prices set by the two firms in a (static Bertrand) equilibrium where the firms compete in prices? What is the level of profits obtained by each firm**(6mark)**

ii) What are the quantities produced by the two firms in a (static Cournot) equilibrium where firms compete in quantities? What is the level of profits obtained by each firm? **(6marks)**

iii) Suppose now that firm 1 takes the lead and firm 2 follows, determine the level of output, price and profits of each firm. **(6marks)**

Question seven

a) Completeness and Transitivity are key axioms of consumer theory. Explain what is meant by each of the axioms **(5marks)**

b) Show the relationship between marginal revenue and the price elasticity of demand under monopoly **(4marks)**

c) What is meant by market failure? Illustrate two examples of market failure **(4marks)**

d) Explain why a firm may continue to produce when it is incurring losses**(6marks)**

e) Given a Cobb-Douglas function of the form: $Q = b_0 L^{b_1} K^{b_2}$

i) Find the marginal rate of substitution**(4marks)**

ii) Find the elasticity of substitution **(4marks)**

GOOD LUCK

END