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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR
SECOND YEAR, FIRST SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF SCIENCE
(BUSINESS ADMINISTRATION)

Date: 17th April, 2023
Time: 2.30pm – 4.30pm

KFI 201 - INTERMEDIATE MICRO – ECONOMIC THEORY

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

PRODUCTION

Theory of production explains the principles by which a business firm decides how much of each commodity that it sells (its “outputs” or “products”) it will produce, and how much of each kind of labour, raw material, fixed capital good, etc., that it employs (its “inputs” or “factors of production”) it will use. It deals with the relationship between the prices of commodities and the prices (or wages or rents) of the productive factors used to produce them as well as the relationships between the prices of commodities and productive factors, on one hand, and the quantities of these commodities and productive factors that are produced or used, on the other hand. The various decisions a business enterprise makes about its productive activities can be classified into three layers of increasing complexity. The first layer includes decisions about methods of producing a given quantity of the output in a plant of given size and equipment. It involves the problem of what is called short-run cost minimization. The second layer, including the determination of the most profitable quantities of products to produce in any given plant, deals with what is called short-run profit maximization. The third layer, concerning the determination of the most profitable size and equipment of plant, relates to what is called long-run profit maximization.

However much of a commodity a business firm produces, it endeavours to produce it as cheaply as possible. Taking the quality of the product and the prices of the productive factors as given, the firm's task is to determine the cheapest combination of factors of production that can produce the desired output. This task is best understood by use of production functions that can be classified according to the degree of substitution of one input by the other. The production function states the amount of product that can be obtained from each and every combination of factors. This relationship can be written mathematically as $y = f(x_1, x_2, \dots, x_n; k_1, k_2, \dots, k_m)$. Though the quantities of the factors determine the quantity of output, the reverse is not true, and as a general rule there will be many combinations of productive factors that could be used to produce the same output. Finding the cheapest of these is the problem of cost minimization. The cost of production is simply the sum of the costs of all of the various factors. It can be expressed using a cost equation expressed as: $C = p_1x_1 + \dots + p_nx_n + r_1k_1 + \dots + r_mk_m$.

- a) Explain your understanding on the following terms;
- Outputs
 - Inputs production function
 - Cost function
 - Isoquants
 - Long run period
 - Production set
- (6 Marks)
- b) From the cost equation above, assume now there are only two factors of production whose prices are p_1 and p_2 . Let x_1 and x_2 be the amount used for each of the two factors respectively and let $f(x_1, x_2)$ be the production function for the firm when two inputs are in use.
- Write the cost equation associated with the two inputs. (1 Mark)
 - If the producer wants to find the cheapest way to produce a given level of output y , formulate his production problem (3 Marks)
 - Find the conditional factor demands for each of the inputs x_1 and x_2 if $y = x_1^a x_2^b$ (6 Marks)
- c) With the help of equations, state and explain any three types of production functions that can be employed in a firm (6 Marks)
- d) As outlined in the case, a firm must determine the cheapest combination of factors of production that can produce the desired output so as to attain maximum profits. This may require substitution one input for the other.
- Using the production in (b), find the Marginal Rate of Technical Substitution (MRTS) between x_1 and x_2 . (4 Marks)
 - If x_1 and x_2 are each increased by a constant 'k', show the effect of this change on the provided production function in (b), and state the type of return it is exhibiting. (4 Marks)

QUESTION TWO (20 MARKS)

- a) A community in Nakuru County of Kenya derives utility from consumption of two good: Good A and Good B. It has a budget of £1200 to spend on the two goods. The community's utility function for the two goods is presented as;
- $$U(X_A, X_B) = 4.5 X_A^{\frac{1}{3}} X_B^{\frac{2}{3}}$$
- where X_A and X_B are the units of good A and good B demanded respectively. Given that prices of good A and good B are £1 and £2 respectively, find the community's demand functions for the two commodities. (8 Marks)
- b) Explain three properties of consumer preference ordering which imply that indifference curves never cross and are always downward sloping and convex. (6 Marks)
- c) Show the various states of consumer equilibrium with perfect substitutes goods giving an account of different prices, that is $P_1 < P_2$, $P_1 > P_2$, $P_1 = P_2$, where P_1 and P_2 are prices of good X_1 and X_2 respectively. Explain your answer as clearly as possible. (6 Marks)

QUESTION THREE(20 MARKS)

- a) A firm in perfectly competitive market produces and sells two goods Q_1 and Q_2 priced at KES 50 and 60 respectively. The firms total cost function is given as

$$TC = 3Q_1^2 + 3Q_1Q_2 + 2Q_2^2 + 10$$

Required;

- i) Find the total revenue function of the firm (1 Mark)
 - ii) Find the profit function of the firm (3 Marks)
 - iii) Find the critical values of Q_1 and Q_2 for profit maximization (6 Marks)
 - iv) By applying the second order condition, verify that the critical values present the maximum profit (4 marks)
- b) Illustrate and explain by a well labelled diagram the effect of imposing a quantity tax on price under monopoly market structure. (6 Marks)

QUESTION FOUR (20 MARKS)

- a) A Pareto efficient allocation makes each agent as well-off as possible given the utility of the other agent. Assuming two goods and given the utility of B as $UB(X_B^1, X_B^2)$ such that $X_A^1 + X_B^1 = W^1$ and $X_B^2 + X_B^2 = W^2$, show that in a Pareto efficient allocation the MRS between the two goods must be the same.

(10 Marks)

- b) Indifference Curves can take very peculiar shapes. Using diagrams, explain any four different shapes of indifference curves.

(10 Marks)

QUESTION FIVE (20 MARKS)

- a) Suppose that a consumer has a demand function for good X of the form

$$Z = 15 + \frac{M}{12P}$$

Where M is the income level and P is the price level of Z. The original income of this consumer is ksh. 150 per day while the price of good Z is ksh. 5 per unit. If the price of good Z falls to ksh. 3, and assuming Z is a normal good, determine the income and substitution effect of this price change. (8 Marks)

- b) Explain how Slutsky's identity can be used to reveal the type of a good in consideration. (6 Marks)

- c) Use the second order profit maximizing condition to show that the Marginal Cost curve must be steeper than Marginal revenue curve in a perfect competitive market. (6 Marks)