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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY

UNIVERSITY EXAMINATION, 2024/2025ACADEMIC YEAR

SECOND YEAR, FIRST SEMESTER EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE

(BUSINESS ADMINISTRATION)

Date: 9th August, 2024

Time: 2.30pm –4.30pm

KFI 2203 INTERMEDIATE MICRO ECONOMIC THEORY

INSTRUCTIONS TO CANDIDATES

ANSWER **QUESTION ONE (COMPULSORY)** AND **ANY OTHER TWO** QUESTIONS

QUESTION ONE (30 MARKS)

MANUFACTURE OF FRESH BEVERAGE

Freshi Beverages is a Kenyan manufacturer of popular fruit juices, including their flagship mango juice. It experiences a surge in demand for their mango juice, particularly during peak harvest seasons hence calling for the need to optimize production to meet this demand without compromising quality or profitability. The company therefore utilizes production principles such as Short-Run Cost Minimization focusing on **p**roducing the maximum amount of mango juice within the constraints of their existing factory size and equipment. To achieve this, Freshi Beverages has adopted a production function of the form $Q(K,L) = AK^{\beta}L^{\alpha}$, which helps the management identify and analyze the most economical combination of resources to achieve their desired output of high-quality mango juice. Once Freshi understands their optimal production cost, they are expected to work towards short-run profit maximization which involves deciding the most profitable level of mango juice production within the limitations of their current setup.

Freshi may therefore adjust production levels during peak harvest to capitalize on lower mango prices while maintaining their profit margin. As demand continues to grow, Freshi plans to explore long-run profit maximization. This could involve expanding their factory, investing in additional processing lines, or even building strategic partnerships with mango suppliers to secure consistent raw materials. Freshi's ability to effectively manage its production processes and input usage is crucial for maintaining competitiveness and profitability, ensuring that it remains a leading player in the juice industry in Kenya.

a) Consumers are assumed to have revealed preferences on various goods which differs from one consumer to another. Explain the weak and strong axioms of revealed preference hypothesis according to Freshi Beverages (2 marks)

b) Given that the actual utility function of a Freshi Beverages consumer has utility function of Cobb-Douglas form given as follows $U(X_1X_2) = X_1^{\frac{1}{2}}X_2^{\frac{1}{2}}$ and the budget constraint is given as $P_1X_1 + P_2X_2 = M$; where P_1 and P_2 are prices of good X_1 (Mango) and X_2 (Cocktail) respectively while M is income level;

i) Compute Marshallian demand functions for X_1 and X_2

(4 marks)

ii) Compute quantity demanded hence level of utility if the P_1 = Kshs. 4, P_2 = Kshs. 5 and M= Kshs 200

(2 marks)

c) Determine the Freshi Beverages long-run profit maximizing quantity and profit.

(4 marks)

d) Suppose Freshi Beverages behaves like a monopoly with a demand function given as Q = 4000-2P, where Q is the output level sold and P is the price per unit of output. The firm's marginal cost is given as Kshs. 200.

i) Calculate the equilibrium quantity and price for the Freshi Beverages

(4 marks)

ii) Suppose the Monopolist behaves competitively, how would the answer (i) above change (show all your workings)

(4 marks)

iii) A monopoly is known to cause inefficiency, find the value of the deadweight loss due to monopoly in the market

(4 marks)

e) The Freshi Beverages has a production function of Cobb-Douglas form given as $Q(K, L) = AK^{\beta}L^{\alpha}$. Demonstrate and explain circumstances under which the function exhibit.

i) Increasing returns to scale (2 marks)

ii) Decreasing returns to scale (2 marks)

iii) Constant returns to scale (2 marks)

QUESTION TWO (20 MARKS)

a) Using examples explain basic assumptions about consumer preferences.

(6 marks)

b) Show mathematically that the slope of the isoquant is equal to the ratio of the marginal products of the two inputs

6 marks)

c) Given a utility function of the consumer in the natural log form as $U(X_1X_2) = 0.36lnX_1 + 0.64lnX_2$ calculate the rate at which the consumer is willing to substitute the two goods. (*Show all your workings)*

(8 marks)

QUESTION THREE (20 MARKS)

a) Mercy utility function is given as $U(X_1 X_2) = X^2Y$. If P_x and P_y are the prices of good X and Y respectively while M is the income level of the consumer. Calculate the ordinary demand functions yield maximum satisfaction to the consumer.

(8 marks)

b) Assume that Mercy has an income amounting to Kshs. 240 and she faces a prices P_x = Kshs. 3 and P_y = Kshs. 4. If the price of good X has fallen to Kshs. 2 while that of Y remains constant, determine;

i) The numerical values of substitution effect of price change (5 marks)

ii) The numerical values of income effect of price change (5 marks)

iii) The total effect of price change hence the nature of the good (2 marks)

QUESTION FOUR (20 MARKS)

a) Using a well labelled diagram, show how long-run equilibrium is achieved in a perfectly competitive markets structure

(6 marks)

b) A manufacturing firm faces the problem as stated below;

$MinC = wL + rK$

s.t

$Q(K, L) = K^{\frac{1}{3}}L^{\frac{2}{3}}$

Assume the management has approached you advice on the amount of inputs that will minimize the firms' costs. What advice would you give the firm? Show all the working.

(10 marks)

c) Using a diagram explain consumer's interior and corner solutions that maximizes the consumer satisfaction level (4 marks)

QUESTION FIVE(20 MARKS)

a) A monopolist faces two markets with the following demand functions

$X_1 = 100 - P_1$ (Market one demand function)

$X_2 = 100 - 2P_2$ (Market two demand function)

Given that the firm has a marginal cost Kshs. 20. Determine the price that the firm should charge in each market in order to maximize profits if the monopolist;

i) Can price discriminate (6 marks)

ii) Cannot price discriminate (6 marks)

b) Given two consumers with the following utility functions. Show that the two consumers have the same preferences; (*Hint: U_1-first consumer utility and U_2 – second consumer utility*)

$U_1(x, y) = X^2Y^2$

$U_2(x, y) = X^3Y^3$ (8 marks)