MACHAKOS UNIVERSITY

University Examinations 2021/2022 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF BUSINESS ADMINISTRATION

FIRST YEAR FIRST SEMESTER EXAMINATION FOR

MASTER OF …………………………………………..

EET 800: ADVANCED MICROECONOMICS I

DATE: **TIME:**

INSTRUCTIONS

ANSWER question ONE and any OTHER **THREE** questions

QUESTION ONE (24 MARKS)

a) A firm operates in a perfectly competitive market. Explain two possible ways it can cultivate a competitive edge over the other competing firms to maximize its profits.

(4 marks)

b) According to the theory of consumption a rational consumer maximizes his utility subject to his income. However, in a nationwide household survey it was found out that the happiness index of many households was a function of not only income levels but other critical factors. Discuss two of those other possible factors.

(4 marks)

c) In a duopoly market, the inverse market demand and cost functions of the firms are expressed as follows.

$P(q) = 300 - q$ where $q = q_1 + q_2$

$C(q_1) = 4.5q_1^2$

$C(q_2 = 100q_2$

Determine the Stackelberg equilibrium given that firm 1 is the quantity leader

(4 Marks)

d) The indirect function of a certain household is expressed as follows.

$$V(p, m) = \frac{m^2}{16p_1 p_2}$$

Compute the corresponding compensated demand functions

(4 Marks)

e) A manufacturing company uses labour and capital to produce certain kinds of electronic equipment. The production function of the company is defined as follows

$$Q = L^{0.7} K^{0.3}$$

where Q is the output and L and K are units of labour and capital used for production. The prices per unit of labour and capital are w and r respectively

i) Derive the corresponding profit function for the firm

(4 marks)

ii) Check the legitimacy of the profit function derived in (i) above

(4 Marks)

QUESTION TWO (12 marks)

a) A certain firm seeks to minimize its cost of production subject to producing a given level of output. The production function for the firm is expressed as follows:

$$Q = 12L^2 K^3$$

where L and K are units of labour and capital used in production.

i) Determine the conditional factor demand functions and the associated cost function of the firm

(7 marks)

ii) Suppose the firm would wish to maximize its output subject to spending $ 1200 on the two inputs, L and K, whose costs per unit are $ 6 and $ 12 respectively. Find the optimal levels of labour and capital that should hired.

(2 marks)

b)   Find the elasticity of substitution for the following general CES technology

$$f(x_1, x_2) = (a_1 x_1^k + a_2 x_2^k)^{\frac{1}{k}}$$

(3 marks)

QUESTION THREE   (12 marks)

a) A steel manufacturing company uses two inputs, X_1 and X_2, for production of its output. The prices per unit of input are W_1 and W_2 for X_1 and X_2 respectively. The cost function of the company is defined as follows.

C $(W_1, W_2, Q) = 12W_1{}^{1/3} W_2{}^{2/3} Q$

where Q is the output, W_1 and W_2 are the prices of two inputs, X_1 and X_2, respectively

Determine the production function of the company.

(7 marks)

b) Using the function derived above explain the properties of a legitimate production function

(5 Marks)

QUESTION FOUR   (12 marks)

a) The utility function of a certain consumer is expressed as follows.

U $= 120Q_1{}^{0.3} Q_2{}^{0.6}$

where Q_1 and Q_2 represents amounts of two composite commodities Q_1 and Q_2 whose prices per unit are $ 24 and $ 30 respectively. She has $ 4,800 to spend on the two commodities.

Formulate a constrained utility maximization problem and solve it to determine optimal levels of the commodities and utility. Find the second order condition and interpret it.
(7 marks)

b) Explain and illustrate with diagrams the likely equilibrium market conditions in short run and lung run for a product sold in a perfectly competitive market
(5 marks)

QUESTION FIVE **(12 marks)**

a) Numerous traders sell an identical product that faces perfect market conditions. The market demand function and the cost function of each trader are expressed as follows

$Q = 1000 - 50p$

$C(q) = 2q^3 + 20q^2 + 85$

   i) Determine the quantity that each trader should supply to maximize profit and at what price

   (6 marks)

   ii) Calculate the optimal number of firms in the market if a quantity tax of Ksh. 2 is

   introduced on every amount consumed   (2 marks)

b) What are cartels? Explain how cartels seek to maximize their profits.

   (4 markets)