MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF ECONOMICS AND STATISTICS

BACHELOR OF ECONOMICS AND FINANCE

BACHELOR OF ECONOMICS

EET 300: MICROECONOMIC THEORY III

DATE: 24/3/2021   **TIME: 8.30-10.30 AM**

INSTRUCTIONS:

    (i)   **Answer question one (Compulsory) and any other two questions**

    (ii)   **Do not write on the question paper**

    (iii)   **Show your workings clearly**

QUESTION ONE (COMPULSORY) (30 MARKS)

a)   In a duopoly market, the market demand and cost functions of the firms are given as:

        $P = 100 - 0.5X$; *where* $X = X_1 + X_2$

        $C_1 = 5X_1$

        $C_2 = 0.5X_2{}^2$

        i.   Compute the cournot equilibrium price and quantity   (5 marks)

        ii.   If firm 1 is a quantity leader, determine the equilibrium price and quantities in the market   (5 marks)

b)   Using relevant illustrations explain **four** types of production functions   (8 marks)

c)   Given the indirect utility function $V(p,m) = \dfrac{m^2}{4p_1 p_2}$

        i.   Demonstrate the properties of indirect utility functions.   (6 marks)

        ii.   Compute the corresponding compensated and uncompensated demand functions

                              (6 marks)

QUESTION TWO (20 MARKS)

a) A short run production function is given as $Q = X^{0.5}$, *where* Q is the output and X is the input. Is the production function concave? Show your working. (4 marks)

b) Let *p* represent the output price and *w* represent the input price. Derive the firm's profit function. (8 marks)

c) Is the profit function derived legitimate? Show your working. (8 marks)

QUESTION THREE (20 MARKS)

a) The objective of a rational consumer is to obtain the highest possible utility. Suppose a consumer seeks to maximize utility given by the following function:

$$u = x_1 x_2$$

Required:

  i. The Marshallian demand functions (6 marks)

  ii. The Hicksian demand functions (4 marks)

  iii. The consumer's expenditure function (4 marks)

b) Explain the characteristics of a legitimate production function (6 marks)

QUESTION FOUR (20 MARKS)

a) Consider an industry with the following structure. There are 50 firms that behave in a competitive manner and have identical cost functions given by:

$$c(y) = \frac{y^2}{2}$$

The demand for the product is given by $D(P) = 1000 - 50P$

  i. What is the total supply from the market? (3 marks)

  ii. What is the equilibrium price and quantity in the competitive market? (2 marks)

b) What is elasticity of substitution? Compute the elasticity of substitution for the following function. (5 marks)

$Q = AL^{\alpha} K^{\beta}$

c) Given the firms production function as $y = AL^{\alpha} K^{1-\alpha}$

Let *w* be the price of labour and *r* the price of capital. So that the firm's expression of the cost equation is given as $C = wL + rK$

Derive the corresponding cost function. (10 marks)

QUESTION FIVE (20 MARKS)

a)   Given the following cost function:

$C(w_1, w_2, y) = 10w_1^{\frac{1}{3}}w_2^{\frac{2}{3}}y$, where y is the output and w_1 and w_2 are the prices of two inputs x_1

and x_2 respectively.   Check whether the cost function satisfies the properties of a cost

function.   (10 marks)

b)   From the cost function in a) determine the underlying production function. (10 marks)