MACHAKOS UNIVERSITY

University Examinations for 2022/2023 Academic Year

SCHOOL OF BUSINESS, ECONOMICS AND HOSPITALITY AND TOURISM MANAGEMENT

DEPARTMENT OF ECONOMICS

THIRD YEAR ……. SEMESTER EXAMINATION FOR

BACHELOR OF ECONOMICS AND FINANCE

BACHELOR OF ECONOMICS AND STATISTICS

BACHELOR OF ECONOMICS

BACHELOR OF ARTS

EET 300: MICROECONOMIC THEORY III

DATE: **TIME:**

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) Given the following utility function:

$$U = 10x_1^{0.5}x_2^{0.5}$$

(i) Derive the Marshallian Demand functions for good 1 and good 2 (6 marks)

(ii) Test the properties of the demand functions derived in (i) above (4 marks)

b) Given the following production function:

$$Y = 10K^{0.4}L^{0.5}$$

(i) Derive the corresponding profit function (8 marks)

(ii) Test the convexity property of the profit function derived in (i) above (4 marks)

c) Using relevant examples, explain four types of oligopoly (8 marks)

QUESTION TWO (20 MARKS)

a) Given the following Constant elasticity of substitution (C.E.S.) production function:

$$Q = A\left(\alpha L^{-\ell} + \beta K^{-\ell}\right)^{-\frac{1}{\ell}}$$

(i) Compute its elasticity of substitution (6 marks)

(ii) Under what circumstances does the C.E.S transform to the other forms of the production function? (4 marks)

b) Given the following utility function:

$$U = x_1^{0.5} x_2^{0.5}$$

(i) Derive the Hicksian demand functions for good 1 and good 2 (5 marks)

(ii) Derive the Corresponding expenditure function (3 marks)

(iii) Prove Shepherd's lemma (2 marks)

QUESTION THREE (20 MARKS)

a) Consider an industry with two firms each having marginal cost equal to zero. The inverse demand curve facing this industry is:

$P = 50 - 0.5Y$ Where: $Y = y_1 + y_2$

Compute the equilibrium output, price and profits under:

(i) Cournot (5 marks)

(ii) Stackelberg (5 marks)

b) Given the following cost function:

$$c(w, r, Q) = 2w^{0.5} r^{0.5} Q^{0.5}$$

(i) Derive the corresponding production function (7 marks)

(ii) Is the derived production function in (i) above concave? Prove. (3 marks)

QUESTION FOUR (20 MARKS)

a) Given the following production function:

$$Y = 0.189x_1^{\frac{1}{3}}x_2^{\frac{2}{3}}$$

(i) Derive the corresponding cost function (6 marks)
(ii) Is the cost function derived from (i) above legitimate? (6 marks)

b) Suppose an oligopoly market structure is defined by the following functions:

The industry / market demand function is: $Q_M = 248 - 2P$

The followers total cost function is given as: $TC_F = \frac{1}{6}Q^2 - 16Q$

The leader's total cost function is: $TC_L = 0.05Q_L^2$

Required:

The equilibrium price, quantities and profits under price leadership. (8 marks)

QUESTION FIVE (20 MARKS)

a) A monopolist's demand function is given as:

$Q = 2000 - 10P$, where Q is the quantity is produced and sold and P is the price per unit in Ksh. If the firm's marginal cost is Ksh100:

(i) Calculate the monopolist's equilibrium quantity and price. (4 marks)
(ii) Suppose the monopolist behaves competitively, how would the answers in (i) above change? (4 marks)

b) A consumer's indirect utility function is given as:

$$V(P, M) = \frac{M^2}{4P_1P_2}$$

State and demonstrate (prove) the four important identities in consumer theory (12 marks)