MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS
2018/2019 ACADEMIC YEAR
FOURTH YEAR FIRST SEMESTER

SCHOOL OF BUSINESS & ECONOMICS
BACHELOR OF ARTS IN ECONOMICS

COURSE CODE: ECO 410

COURSE TITLE: ADVANCED MICROECONOMICS

DATE: 5TH DECEMBER, 2018 **TIME: 8.30 – 10.30 A.M**

INSTRUCTIONS TO CANDIDATES

Answer Question **ONE** and any other **THREE** questions

This paper consists of 2 printed pages. Please turn over.

QUESTION ONE

(a) Differentiate between the following terms

(i) Weak monotonicity and strong monotonicity of the production function — 2 marks

(ii) Weak essentiality and strong essentiality of inputs in production — 2 marks

(iii) First and second Hoteling's Lemma — 2 marks

(iv) Stackelberg's oligopoly market model and Cournot oligopoly market model — 2 marks

(b) A Constant Elasticity of Substitution (CES) production function is given as:

$$Q = A\left(\frac{5}{7}L^{-\rho} + \frac{2}{7}K^{-\rho}\right)^{-\frac{1}{\rho}}$$

(i) Find the Marginal Rate of Substitution of labor and capital ($MRTS_{L,K}$) — 5 marks

(ii) Find the elasticity of substitution, δ — 4 marks

(c) The following is a cost function for a given firm:

$$C(w_1, w_2) = 18w_1^{\frac{1}{3}}w_2^{\frac{2}{3}}y$$

Where y is the output and w_2 and w_2 are the prices of two inputs X_1 and X_2 respectively and y is output.

(i) Demonstrate that the cost function is concave and non-increasing in input prices — 2 marks

(ii) Recover the associated output function using the Shepherd's lemma — 6 marks

QUESTION TWO

(a) Suppose every firm in a perfect competitive market has the following cost function

$$C(y) = y^3 - 10y^2 + 42y$$

Where y = output of the firm

(i) How much output will each firm produce and at what price? 3 marks

(ii) Suppose the market demand function is given as $Y = 2{,}750 - 75P$, what would be the total market demand? 1 mark

(iii) Given the information obtained in (i) and (ii) above, what is the optimal number of firms in this market? 1 mark

(iv) Suppose a quantity tax of Kshs. 3 is introduced on every amount consumed, what is the new market demand and new optimal number of firms? [Assume the burden of the tax is fully reflected in the price] 1 marks

(v) How many firms exit the market due to the price rise? 1 mark

(b) Discuss any 4 properties of a well-behaved profit function 8 marks

QUESTION THREE

An oligopoly market comprises two firms facing the demand curve specified as $P = 100 - 2Y$, where Y is the total industry output($Y = Y_1 + Y_2$). The respective cost functions for the two firms are gives as $C_1 = 40$ and $C_2 = 0.5Y_2$ respectively.

(a) Assuming that the firms are engaged in a sequential game (Stackelberg Model) and that Firm 1 is the quantity leader and Firm2 is the quantity follower:

(i) Find the reaction curve for Firm 2 3 marks

(ii) Find the equilibrium price (P) and quantities (Y_1, Y_2, Y) 6 marks

(b) Now assume that the firms are engaged in a simultaneous game (Cournot Model), how would the values in part (a) (ii) differ? 6 marks

QUESTION FOUR

(a) A production functions is given as $Y = 5K^{0.2}L^{0.6}$

Where K and L are the units of capital and labor respectively

(i) Characterize the relationship between the two inputs as shown in the production function — 1 mark

(ii) Is the production function concave? — 3 marks

(iii) Find the values of K and L (expresses as a function of output) for which the total cost of the firm is minimized, given that the respective prices of capital and labor is given as $r = 3$ and $w = 1$. — 9 marks

(iv) What are the values of K and L if output Y=1650 — 2marks

QUESTION FIVE

A one-inputproduction function for a firm is given as $Y = x^{\frac{1}{2}}$. Taking output price and input price as p and w respectively:

(i) Derive the firm's profit function — 7 marks

(ii) Show that the profit function is convex — 2 marks

(iii) Derive the firm's supply function — 2 marks

(iv) Derive the unconditional factor demand function — 2 marks

(v) If you are given that the output price is \$0.05 and input price \$0.03, what is the unconditional factor demand for input X? — 2 marks

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