



MACHAKOS UNIVERSITY

University Examinations for 2018/2019 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

THIRD YEAR SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF ECONOMICS

EET 300: MICROECONOMIC THEORY III

DATE: 25/7/2019

TIME: 2:00 – 4:00 PM

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) You are provided with the following production function where y the output is and x is the input: $y = x^a$, for what values of a is the production function a legitimate function?
(8 marks)
- b) Given the firm's production function as $y = AL^\alpha K^{1-\alpha}$
Let w be the price of labour and r the price of capital. Derive the corresponding cost function.
(10 marks)
- c) A profit function is convex in input and output prices as long as the production function is strictly concave. Consider a firm's profit function given as:
$$\pi(p, w) = \frac{p^3}{w_1 w_2}$$
 where p is the output price and w_1 and w_2 are the prices of the two inputs x_1 and x_2 , respectively. Would you say that the firm's production function is strictly concave? Show your working.
If $p = \text{sh. } 500$, $w_1 = w_2 = \text{sh. } 100$, determine the profit maximizing input demands and output.
(12 marks)

QUESTION TWO (20 MARKS)

- a) Given the cost function; $C = kyw^\alpha r^{1-\alpha}$
Derive the corresponding production function (10 marks)
- b) Explain in details the properties of a profit function (10 marks)

QUESTION THREE (20 MARKS)

- a) Consider a production function $Y = x^a$ where $0 < a < 1$ Let p be the price of output and w be the Price of input.
Derive the corresponding profit function. (10 marks)
- b) Explain in details the properties of a cost function (10 marks)

QUESTION FOUR (20 MARKS)

- a) Clearly distinguish between the following pairs of concepts as used in microeconomic theory. Use relevant economic methodologies where necessary. (12 marks)
- (i) Hotelling's Lemma and Shepherd's Lemma
 - (ii) Duality in consumption and duality in production
 - (iii) Weak monotonicity and strong essentiality
 - (iv) Compensated demand function and Conditional demand function
- b) 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) If firm 1 is a quantity leader, determine the equilibrium price and quantities in the market (3 marks)
 - ii) Suppose the two firms decided to form a cartel and maximize their joint profits, determine the equilibrium price, quantities and profit in the market (5 marks)

QUESTION FIVE (20 MARKS)

Given an indirect utility function as: $(P, M) = \frac{M}{\sqrt{P_1 P_2}}$, where P_1 and P_2 are the prices of two goods

X_1 and X_2 , respectively and M is the consumer's income:

- i) Verify the properties of the above indirect utility function (5 marks)
- ii) Find the corresponding expenditure function (5 marks)
- iii) Using the above information, state and demonstrate the Slutsky's equation (10 marks)