



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

THIRD YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF ECONOMICS AND STATISTICS

BACHELOR OF ECONOMICS AND FINANCE

BACHELOR OF ECONOMICS

BACHELOR OF ARTS

EET 300: MICROECONOMIC THEORY III

DATE: 11/12/2019

TIME: 2.00-4.00 PM

INSTRUCTIONS:

- (i) Answer question one (Compulsory) and any other two questions
- (ii) Show your workings clearly

QUESTION ONE (COMPULSORY) (30 MARKS)

a) Clearly distinguish between the following pairs of concepts as used in Microeconomics.

Make use of illustrations and diagrams as much as you can:

- i. Hotelling's Lemma versus Shepherd's Lemma (3 marks)
- ii. Duality in consumption versus duality in production (3 marks)
- iii. Weak Monotonicity versus Strong Essentiality (3 marks)
- iv. Bertrand equilibrium versus Price Leadership equilibrium (3 marks)

b) Given the production function of firm A as:

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

Where Y is the firm's output while x_1 and x_2 are inputs 1 and 2, respectively.

- i. Suppose w_1 and w_2 represent the prices for inputs 1 and 2, respectively, derive the corresponding cost function of firm A. (6 marks)
- ii. Is the cost function derived above legitimate? Prove your answer. (7 marks)

- c) Demonstrate that the Cobb Douglas production function is a special case of the Constant Elasticity of Substitution (CES) production function (5 marks)

QUESTION TWO (20 MARKS)

Given the following utility function:

$$U(x_1, x_2) = x_1^\alpha x_2^{1-\alpha}$$

Where: x_1 and x_2 are units of good 1 and good 2 consumed, respectively.

- a) Derive:
- The Marshallian demand functions (5 marks)
 - The indirect utility function (3 marks)
 - The expenditure function (2 marks)
- b) Are the functions derived in (1) above legitimate? Show your workings. (10 marks)

QUESTION THREE (20 MARKS)

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

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

- b) Given a production function as:

$$y = x_1^{0.3} x_2^{0.6}$$

Required:

- Derive the corresponding profit function. (7 marks)
- Is the profit function derived in (i) above legitimate? Show all your workings. (8 marks)

QUESTION FOUR (20 MARKS)

An oligopolistic industry has only two firms which face the following market demand curve:

$$D(P) = 200 - 2P$$

The firms have the following respective cost functions:

$$c_1(q_1) = 0.5q_1^2$$

$$c_2(q_2) = 5q_2$$

Required:

Find the optimal output (s), price and profit level under:

- a) Cournot equilibrium
- b) Stackelberg equilibrium
- c) Bertrand equilibrium
- d) Cartel equilibrium (20 marks)

QUESTION FIVE (20 MARKS)

- a) Given the following production function:

$$y = x^{0.5}$$

Does this function satisfy the properties of a legitimate production function? Show all your workings. (8 marks)

- b) Derive Roy's identity and explain what it is used for. (5 marks)
- c) Given the indirect utility function

$$V(p, m) = \frac{m^2}{4p_1p_2}$$

Derive:

- i. The corresponding ordinary demand functions (3 marks)
- ii. The corresponding expenditure function (2 marks)
- iii. The corresponding compensated demand functions (2 marks)