



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 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: 10/8/2021

TIME: 11:00 – 1:00 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) Clearly distinguish between the following pairs of concepts. Make use of illustrations and diagrams as much as you can
- i. Duality in Production and Duality in Consumption (3 marks)
 - ii. Hotelling's Lemma and Shepherds Lemma (3 marks)
 - iii. Compensated Demand functions and Uncompensated Demand functions (3 marks)
 - iv. Price Leadership and Quantity Leadership (3 marks)
- b) Given the following production function:

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

Is this function legitimate? Prove your answer. (8 marks)

- c) Consider an industry with two firms each having marginal cost equal to 20. The inverse demand curve facing this industry is $p(y) = 100 - y$. Where $y = y_1 + y_2$.

Required:

- i. Determine the Stackelberg equilibrium given that firm 1 is the quantity leader (4 marks)
- ii. Determine the Cournot equilibrium (4 marks)
- iii. Compare the solutions in (i) and (ii) (2 marks)

QUESTION TWO (20 MARKS)

- a) Demonstrate that the Cobb Douglas Production function is a special case of the Constant Elasticity of Substitution (CES) Production function. (8 marks)
- b) Given the following production function:

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

- i. Derive the corresponding profit function (8 marks)
- ii. Check the legitimacy of the profit function derived in (i) above (4 marks)

QUESTION THREE (20 MARKS)

- a) What is elasticity of substitution? Compute the elasticity of substitution for the following function. (6 marks)

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

- b) Given the following utility function:

$$U^2 = X_1 X_2$$

Required:

- i. Derive the Marshallian demand functions and check their properties (8 marks)
- ii. Derive the indirect utility function and test its properties (6 marks)

QUESTION FOUR (20 MARKS)

- a) Given the following production function:

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

Derive the corresponding cost function and check its legitimacy (12 marks)

- b) Using relevant examples, explain four types of oligopoly markets (8 marks)

QUESTION FIVE (20 MARKS)

a) Given the following indirect utility function:

$$V(p, m) = \frac{m^2}{4p_1 p_2}$$

Required:

- i. Derive the corresponding expenditure function and test its properties (8 marks)
 - ii. Derive the corresponding Hicksian demand functions (4 marks)
- b) Suppose every firm in a perfect market has the following cost function

$$C(q) = q^3 - 10q^2 + 28q$$

- i. How much output will each firm produce to maximize profit and at what price (3 marks)
 - ii. Suppose the market demand function is $Q = 600 - 50p$, calculate the optimal number of firms in the market (2 marks)
- c) Derive Roy's Identity (3 marks)