



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2018/2019

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF

BACHELOR OF ECONOMICS

EET 300: MICROECONOMICS THEORY III

DATE: Tuesday, 26th March 2019

TIME: 4.30 p.m. - 6.30 p.m.

INSTRUCTIONS:

- (i) Answer Question One and any other TWO question
- (ii) Show your working clearly

QUESTION ONE (30 MARKS)

- a) Clearly but briefly distinguish between the following pairs of concepts. Make use of illustrations and diagrams where possible.
 - (i) Production possibilities set; Net-put vector [2 Marks]
 - (ii) Input requirement set; Isoquant [2 Marks]
 - (iii) The Marginal Rate of Technical Substitution(MRTS) and the elasticity of substitution (2 marks)
 - (iv) Compensated demand functions; Uncompensated demand functions [2 Marks]
 - (v) Sequential game and simultaneous game (2 marks)
- b) Each of the firms in an industry have a long-run cost function given as:
$$TC = Q^3 - 12Q^2 + 60Q$$

Where Q is output by each firm.

The industry's market demand function is

$$Q = 1440 - 10P,$$

Where P is the price of output per unit.

 - i) Determine each firm's optimal level of output and hence the equilibrium price in the market. (3 Marks)
 - ii) What is the optimal number of firms in this industry? (2 Marks)
- c) A firm's production function is $Y = 2L^{1/2}$ where Y is output and L is labour inputs. Let P be the output price and W be the price of labour. You are required to:-
 - (i) Derive the profit function for the firm (6 Marks)

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- (ii) A legitimate profit function is said to be positively linearly homogeneous in both output and input prices; and convex in both output and input prices. Is the above profit function in (i) above legitimate? Show your working. (6 marks)
- (iii) Suppose the output price and the price of labour are Kshs.1000 and Kshs.100 respectively, compute the profit maximizing levels of output and input. (3 Marks)

QUESTION TWO

- a) Explain the properties of a cost function (5 Marks)
- b) A consumer's indirect utility function is given as: $V(p, m) = \frac{m^2}{16p_1p_2}$; Where the P_s are the prices of two goods respectively, and M is income. Derive the following:
- i) The corresponding expenditure function. [4 Marks]
- ii) The compensated demand function for goods 1 and 2. [3 Marks]
- iii) The uncompensated demand function for goods 1 and 2. [3 Marks]
- c) State and derive the Roy's identity (5 marks)

QUESTION THREE

- a) You are provided with the following production function:

$$Q = A[\alpha L^{-e} + (1 - \alpha)K^{-e}]^{-1/e}$$

Where Q is output; L is Labour and K is Capital

Required

- (i) Name and interpret the parameter A , e and α (6 marks)
- (ii) Show that, if $e=0$, the two inputs labour and capital are imperfect substitutes. (8 marks)
- b) "The cost function is a sufficient statistic for the technology since all the economically relevant information about the technology can be obtained from the cost function." Given the following cost function, verify this statement as thoroughly as you can.

$$C(w_1, w_2, y) = 10w_1^{\frac{1}{3}}w_2^{\frac{2}{3}}y,$$

Where both W_i are the unit prices of two inputs respectively, and Y is output. [6 marks]

QUESTION FOUR

- (a) The minimum cost of hourly production of shoes (Y) depends on the price of machines (r) and the price of labour (w) paid each hour i.e. $C = Yr^{1/2}w^{1/2}$

Required.

- (i) Derive the firm's demand function for machine (K) and Labour (L) (6 marks)
- (ii) Suppose that it costs the firm Kshs. 400 per machine hour and labour costs Kshs. 100 per hour, what will be the firms optimal output if it spends Kshs.100,000 on production. (8 marks)
- (iii) Derive the production function associated with above cost function (6 marks)

QUESTION FIVE

- a) Consider an industry with two firms each having marginal cost equal to zero. The inverse demand curve facing this industry is $p(y) = 100 - y$. Where $y = y_1 + y_2$. Determine the Stackelburg equilibrium. (10 marks)
- b) A firm has a profit function given by the following function

$$\pi(P, W_1, W_2) = \frac{20P^2}{(W_1W_2)^2}$$

Where P and W_i are output and input prices respectively. You are required to:-

- (i) Derive the firm's output supply function and derived input demand functions (6 marks)
- (ii) Show that the output supply function and the derived input demand functions are homogenous of degree 0. (4 marks)