

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF MASTER OF SCIENCE  
IN ECONOMICS

MSEC 811: ADVANCED MICROECONOMICS THEORY I

STREAMS: MSC (ECON)

TIME: 3 HOURS

DAY/DATE: MONDAY 02/12/2019

2.30 P.M. – 5.30 P.M.

**INSTRUCTIONS: Answer ONE question and other THREE questions**

**QUESTION ONE (COMPULSORY)**

- (a) Explain the properties of cost function [10 marks]
- (b) Assume an indirect utility function  $V(P_i, M)$ . Derive the Roy's identify [5 marks]
- (c) The following is production function for a given firm

$$Y = \left[ \text{Min} \left( \frac{x_1}{a_1}, \frac{x_2}{a_2} \right) \right]^{0.75}$$

**Required**

- (i) Derive the firm's conditional input demand function [4 marks]
- (ii) Derive the firms cost function [2 marks]
- (iii) Calculate the firms profit function [2 marks]
- (iv) Derive the firms unconditional demand function [3 marks]
- (v) Derive the firms output supply function [2 marks]
- (d) Consider the effect of price control on a monopoly requiring the price to be not higher than  $P_{max}$ .

$$\text{Max } \Pi = PQ - C(Q)$$

S.t

$$P, Q \geq 0$$

$$Q \leq f(Q)$$

$$P \leq P_{max}$$

**Required:**

Analyze the profit maximizing problem, giving all relevant cases [12 marks]

**QUESTION TWO**

(a) Given a utility function

$$U(x) = 3x_1 + 5x_2$$

**Required:**

(i) Calculate the Marshallian demands for this consumer [6 marks]

(ii) Derive the indirect utility function for this consumer [4 marks]

(iii) Calculate the Hicksian demands for this consumer [6 marks]

(iv) Derive the expenditure function for this consumer [4 marks]

**QUESTION THREE**

(a) Consider a simple case of single output and single input and clearly prove the 1<sup>st</sup> and 2<sup>nd</sup> Hotelling's lemma. [10 marks]

(b) Consider a consumer who consumes two commodities  $X_1$  and  $X_2$ . Suppose the expenditure function for this consumer  $E(p, u) = P_1^{\frac{1}{2}} P_2^{\frac{1}{2}} U$ . Assume the initial situation is such that  $P_1 = 4, P_2 = 1$  and  $M = 200$ . A subsidy program reduces price of  $x_1$  to  $P_1 = 1$ . Suppose consumer is ineligible for this program. How much will he/she pay at most as bribe to be allowed into program? [10 marks]

**QUESTION FOUR**

(a) Assume the following demand expressions  $X^m(P_i, M)$  and  $X^H(P_i, U)$ . Derive and explain the Slutsky's equation. [10 marks]

(b) Derive the condition for both maximum and minimum given a non-positive constraint ( $X < 0$ ) [10 marks]

**QUESTION FIVE**

Suppose the firm's production function is given as  $Y = L^{\frac{1}{4}} K^{\frac{1}{2}}$  use the two step approach to solve the following

(i) Conditional input demand functions [5 marks]

(ii) The minimum cost [3 marks]

(iii) Output supply function [3 marks]

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- (iv) Unconditional input demand functions [4 marks]
- (v) Maximum profit [5 marks]
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