

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATIONS FOR THE AWARD OF MASTER
OF SCIENCE IN ECONOMICS

MSEC 802: ADVANCED MICROECONOMICS

STREAMS: MSC (ECON) Y1S1

TIME: 3 HOURS

DAY/DATE: WEDNESDAY 08/8/2018

2.30 P.M. – 5.30 P.M.

INSTRUCTIONS: Answer question ONE and any other TWO questions

QUESTION ONE

- (a) Explain with reference to a specific utility function, the concept of an indirect utility function. State the properties of an indirect utility function. [6 marks]
- (b) An individual consumer is faced with a utility function of the form:

$$U(X_1, X_2) = 4X_1^2 X_2$$

Where X_1 and X_2 are commodities in his bundle, with a unit price P_1 and P_2 respectively. If the consumer's money income is "M":

- (i) Derive his Marshallian demand function for the commodities X_1 and X_2 [6 marks]
- (ii) Derive the relevant indirect utility function for this consumer [6 marks]
- (iii) What are the compensated demand functions for the respective commodities

[7

marks]

QUESTION TWO

MSEC 802

(a) A firm aims at producing a target level of output of “Q” units. It employs two factor inputs X_1 and X_2 whose prices are r_1 and r_2 per unit respectively. Given a cost outlay of “C” outline the firm's process of cost minimization. Show that for a minimum cost, the bordered Hessian determinant is negative definite [12 marks]

(b) Assume that the firm in (a) above has a production function given by:

$$Q(X_1, X_2) = \left(X_1^{\frac{1}{2}} + 3X_2^{\frac{1}{2}} \right)^2$$

and that the prices of factor inputs are $r_1 = r_2 = 1$. Find the cheapest way to produce 16 units of output. Estimate the respective amounts of factor inputs. [8 marks]

QUESTION THREE

- (a) What are homothetic preferences. Illustrate and explain why perfect substitutes utility function are an example of homothetic preferences. [8 marks]
- (b) Using Slutsky method decompose the demand change resulting from a price into two separate effects. [6 marks]
- (c) Distinguish the two concepts of an expansion path and a price consumption time [6 marks]

QUESTION FOUR

(a) A Cobb-Douglas production functions given by the expression

$$Q = L^\alpha K^\beta \quad 0 < \beta < 1, \alpha + \beta = 1$$

- (i) Show that elasticities of output due to labour and capital are given by α and β [5 marks]

MSEC 802

- (ii) Show that the marginal rate of technical substitution depends only on the ratio of

$\frac{K}{L}$ but on the scale of production and that it diminishes as $\frac{L}{K}$ increases

[5 marks]

- (b) A firm produces good q using the factors of production. Capital (K) and labour (L). the price of capital is “ r ” and the price of labour is “ w ”. the price of output “ q ” is “ p ”. The production function of the firm is given by:

$$q = \sqrt{K} + \sqrt{L}$$

- (i) Obtain the factor demand functions of K and L that will minimize the cost of producing “ q ” unit of output. [4 marks]
- (ii) If the price of capital is $r=1$ and the price of labour is $w=1$. What is the cost function for the firm [4 marks]
- (iii) Obtain the firms average cost [2 marks]

QUESTION FIVE

- (a) Consider the following utility functions for two goods X and Y :

- (i) $U(X, Y) = XY$
- (ii) $U(X, Y) = X^2 Y^2$
- (iii) $U(X, Y) = \ln X + \ln Y$

Show that each of these has a diminishing MRS, but they exhibit constant, increasing and decreasing marginal utility respectively [10 marks]

- (b) A consumer derives utility from commodity X and Y according to the following functions

$$U(X, Y) = \sqrt{X^2 + Y^2} \text{ if } P_x = 3 \text{ and } P_y = 4 \text{ and } M = 50$$

- (i) Maximize the utility of this consumer [5 marks]

MSEC 802

- (ii) Find the values of q_x and q_y demanded [5 marks]
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