KABARAK UNIVERSITY

UNIVERSITY EXAMINATIONS

2015/2016 ACADEMIC YEAR
FOR THE DEGREE OF BACHELOR OF SCIENCE IN ECONOMICS AND MATHEMATICS

ECON 310: ADVANCED MICROECONOMICS

DAY: WEDNESDAY **DATE: 20/04/2016**

TIME: 9.00 – 11.00 A.M. **STREAM: Y3S1**

INSTRUCTIONS:

(i) **Answer Question ONE and ANY other TWO questions**
(ii) **Do not write on the question paper**
(iii) **Show your working clearly**

QUESTION ONE (30 marks)

a) Suppose that a consumer has a demand function for milk of the form:

$$X_1 = 10 + M/10P_1$$

Originally his income is sh. 120 per week and the price of milk is sh.3 per litre. Suppose the price of milk falls to sh. 2 per litre.

Determine: i) the substitution effect (3 mks)
ii) the income effect (3 mks)
iii) the total effect (3 mks)

b) You are given the following Cobb-Douglas production function

$f(X) = X^a$ where $a>0$

Determine: i) Input demand function (2mks)
ii) Output supply function (2mks)
iii) Profit function (2mks)

(b) There are two commodities X_1 and X_2 on which a consumer spends his entire income in a day. He has utility function $U = X^{0.5}_1 X^{0.5}_2$. Find out the optimal quantities of X_1 and X_2 if prices of X_1 and X_2 are sh. 5 and sh.2 respectively and his daily income equals sh.500. (5 mks)

(c) Three oligopolists operate in a market with inverse demand given by $p(Q) = a - Q$, Where $Q = q_1 + q_2 + q_3$. Each firm has a constant marginal cost of production c and no fixed cost. The firms choose their quantities as follows. First firms 1 and 2 simultaneously choose q_1 and q_2 respectively. Then firm 3 observes q_1 and q_2 and chooses q_3. Find the subgame perfect Nash equillibria of this game. (5 mks)

(d)With illustration explain the two step approach to profit maximization (5mks)

QUESTION TWO (20 marks)

(a) With example Proof the hotelling's lemma (5mks)

(b) Given a production function

$$y = a_1 x_1 + a_2 x_2, \ a>0$$

Required:

(i) Calculate the conditional input demand functions. (5 mks)

(ii) Derive the cost function. (5 mks)

(c) Using the convexity property of the profit function with respect to output price (p) illustrate graphically how the output supply function can be derived from the profit function using the hotelings lemma. (5 mks)

QUESTION THREE (20 marks)

(a) Suppose the cost function of a firm is given by.

$$c(w, y) = (2w_1 + 3w_2)y$$

What is the firm's production function? (4 mks)

(b) Using the concavity property of the cost function with respect to input prices, demonstrate graphically how the conditional input demand function can be derived from the cost function using the shepherd lemma. (10 mks)

(c) A firm has two plants with cost function

$$c_1(y_1) = 5y_1^2 \ and$$
$$c_2(y_2) = 2y_2.$$

Required

What is the firm's cost function? (6 mks)

QUESTION FOUR (20 marks)

Given a utility function:

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

(i) Calculate the Marshallian demands for this consumer. (5 mks)

(ii) Derive the indirect utility function for this consumer. (5 mks)

(iii) Calculate the expenditure function for this consumer. (5 mks)

(iv) Calculate the Hicksian demands for this consumer. (5 mks)

QUESTION FIVE

a) You are given the following leontief production function:

$$y = \min\left[\frac{x_1}{a_1}, \frac{x_2}{a_2}\right]^{1/2}$$

Determine:

i) Conditional input demands (2 mks)

ii) The cost function (2mks)

iii) The output supply function (3mks)

iv) Input demand functions (3 mks)

b) Assuming a linear inverse demand function $p = a - q_A - q_B$ and a constant marginal cost MC=C. Firm A moves first and chooses quantity q_A. Firm B observes firm A's output choice and selects its own optimal level of output q_B.

Determine:

i. Equilibrium output of each firm (4mks)

ii. Equilibrium price (2mks)

iii. Profit for each firm (4mks)