MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRIBUSINESS MANAGEMENT AND TRADE

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

MASTER OF SCIENCE IN AGRIBUSINESS MANAGEMENT

AGB 804: ADVANCED AGRICULTURAL PRODUCTION ECONOMICS

DATE: 2/3/2021 **TIME: 9.00-12.00 PM**

INSTRUCTIONS;

- Answer question **ONE** and any other **TWO** questions

QUESTION ONE (20 MARKS)

a) i Describe the assumptions of the classical economic model of pure competition. (3 marks)

ii Explain why the pure competition model continues to be important to agricultural economists? (2 marks)

b) Distinguish between the law of diminishing marginal returns and the law of diminishing marginal costs. (3 marks)

c) i) Describe three production related challenges which continue to exist in the agricultural sector since Kenya's independence. (3 marks)

ii) Discuss three opportunities available for Kenya to exploit. (3 marks)

iii) Given your answer in (ii), describe the possible strategies Kenya could employ to harness her resources to take up these opportunities. (3 marks)

d) Describe three key strategies available to farmers to reduce losses when nature is unfavorable or the markets turn against the farmer. (3 marks)

QUESTION TWO (20 MARKS)

Assume a Cobb – Douglas production function of the form; $Y = 0.5 X_1^{0.5} X_2^{0.4}$

and prices PX_1 = Ksh 20, PX_2 = Ksh 16 and P_y = Ksh 80.

a) Find the least cost combination of inputs at which profit is maximized. (10 marks)

b) Compute the output level at optimal inputs combination. (4 marks)

c) Discuss why the Cobb- Douglas type of production function is popularly estimated by agricultural economists. (6 marks)

QUESTION THREE (20 MARKS)

a) Consider the production function of a farmer:

$Y = 10 + 200X - 2X^2$ with the price of input = Ksh 10 and price of output = Ksh 50. Calculate the optimum profit and output of this function. (12 marks)

b) Determine the minimum cost combination of inputs X_1 and X_2 for an output level of 200 units given the following table; Given : PX_1= Ksh 50 and PX_2 =100 (8 marks)

Units of X_1	Units of X_2
4	24
6	18
8	16
10	15
12	17
14	14
16	10
18	12
20	14

QUESTION FOUR (20 MARKS)

a) Suppose that the product transformation function is given by

$$x = 2y_1^2 + 3y_2^3$$

The price of y_1 is sh.50 and the price of y_2 is sh. 40. Ten units of x are available.

How much x should be applied to y_1 and y_2? (10 marks)

b) Showing your calculations, indicate the degree of homogeneity for the following production functions and interpret your answers:

i. $y = Ax_1^{0.5}x_2^{0.5}$ (3 marks)

ii. $y = Ax_1^{0.5}x_2^{0.8}$ (3 marks)

iii. $y = Ax_1^{0.5}x_2^{0.3}$ (3 marks)

c) What do the second-order conditions of a production function indicate? (1 mark)

QUESTION FIVE (20 MARKS)

a) The objective function faced by a farmer is to maximize revenue from the sale of maize. The objective function to be maximized is

$$R = py \text{ or } R = pf(x_1, x_2)$$

Subject to the following constraints or limitations in the availability of Shillings for the purchase of inputs $x_1$and x_2 :

$$C° = v_1 x_1 + v_2 x_2$$

where $C°$ is some fixed number of Shillings that the farmer has available for the purchase of inputs x_1 and x_2.

i. Using the Lagrange's function, solve for the objective function maximization. (10 marks)

ii. Interpret your final answer. (2 marks)

b) Assume that a production function is $y = x_1^{0.3}x_2^{0.6}$

Assume that the price of x_1 (v_1) is sh.10, and the price of x_2 ($v2$) is sh.30.

Calculate the cost of 1 unit of this bundle. (8 marks)