MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS
2018/2019 ACADEMIC YEAR
THIRD YEAR FIRST SEMESTER

SCHOOL OF BUSINESS AND ECONOMICS
BSC ECONOMICS

COURSE CODE: ARE 3108
COURSE TITLE: AGRICULTURAL PRODUCTION ECONOMICS

DATE: 6TH DECEMBER 2018 **TIME: 0830 – 1030HRS**

INSTRUCTIONS TO CANDIDATES

Answer Question **ONE** and any other **THREE** questions

This paper consists of 3 printed pages. Please turn over.

QUESTION ONE

a) State Euler's Theorem as used in production economics **(2 marks)**
b) Briefly discuss the properties/characteristics of Cobb-Douglas Production Functions **(6 marks)**
c) Enos has a tobacco farm firm in Uriri area having the following functions:

$Q = 0.8P - 20$
$TFC = 180$
$AVC = 4 + 2Q$

Find Enos' profit maximizing level of output and his profit **(4 marks)**

d) The production function expresses a functional relationship between quantities of inputs and outputs in Agricultural Production. Discuss the usefulness of Production Functions as itemized by Olayide and Heady **(5 marks)**
e) Discuss the assumptions used in Linear Programming in solving farm firm optimization problems **(5 marks)**
f) Find the homogeneity of the following production function and state its returns to scale:

$24X^{1/2}Y^{3/2} - 2X^3/Y$ **(3 marks)**

QUESTION TWO

a) Clearly distinguish between the Rate of Technical Substitution and Rate of Product Transformation **(2 marks)**
b) Explain the measures/precautions which should be taken by farm firms against Risks in the production environment **(7 marks)**
c) Given the following output function

$Y_1 = 80 + 0.5Y_2 - 0.125Y_2^2$
And P_{y1} = Ksh 10
P_{y2} = Ksh 4

Determine:

i. The amount of Y_1 and Y_2
ii. The Total Revenue **(6 marks)**

QUESTION THREE

a) Using well labelled diagram(s) distinguish between Competitive, Supplementary, and Complementary products/enterprises **(6 marks)**

b) Wafula has the following maize production function

$$Q = 2K^{0.5}L^{0.3}$$

Where Q is the quantity of maize produced while K and L are units of inputs capital and labour respectively. Supposing that a bag of maize sells at Ksh. 400, the prices of K and L are Ksh 16 and Ksh. 4 respectively, and that he has a total of Ksh. 5000 to spend on the two inputs:

i. Using Lagrangean optimization technique determine the quantities of K and L that Wafula will need in order for him to maximize profit
ii. What will be Wafula's maximum profit **(9 marks)**

QUESTION FOUR

a) Briefly discuss the computational difficulties in linear programming as an optimization technique **(3 marks)**

b) Alamin produces maize and beans in his farm. Each bag of maize contributes ksh 400 to profit while a bag of beans contributes Ksh 500. The production of these two requires three inputs A, B and C and their available quantities are 8, 12 and 7 respectively. To produce one bag of maize, needs 5 units of input A, 3 units of input B but does not need input C. on the other hand, the production of beans requires 2 units of A, 4 units of B and 1 unit of C

Formulate the above as a linear programming problem and using Simplex Method, calculate the optimal bags of maize and beans to be produced and determine Alamin's profit **(12 marks)**

QUESTION FIVE

Kinyanjui's *waru* farm has the following production function

$$y = 8x^{1/2}$$

the price of input x is Ksh 40 per unit while the Total Fixed Costs are ksh 300.

i. Find:
   a) MPP b) APP c) AVC d) ATC e) MC
ii. Suppose that the output price is ksh. 500, find:
   a) AVP b) VMP c) MFC
iii. Using the data, find:
   a) the profit maximizing level of input
   b) the profit maximizing level of output **(15 marks)**

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