MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER

SCHOOL OF BUSINESS AND ECONOMICS
BSC ECON, BSC AGEC, BSC AGBM, BSC FIN ECON, BSC ECON &STAT

COURSE CODE: ECO 1204
COURSE TITLE: MATHEMATICS FOR ECONOMISTS I

DATE: 30TH APRIL, 2018   TIME: 1430 – 1630 HRS

INSTRUCTIONS TO CANDIDATES

Question **ONE** is compulsory

Answer any other **THREE** questions

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

QUESTION ONE

a. Define the following terms as used in Mathematics for Economists. Use examples where necessary
    i. The Domain
    ii. MD_2 demand for money
    iii. Commutative Law of Set Theory
    iv. Quadratic Function
    v. Auxiliary Diagonal in Matrix Algebra   **(5 Marks)**

b. What is an Inverse Matrix? Briefly discuss its properties   **(4 Marks)**

c. What are the limitations of Static (equilibrium) Analysis   **(4 Marks)**

d. Given

A = {2,3,4,6,7,8}   B = {2,5,6,8,1012}   C = {1,3,4,6,7,8,9,12}

    Find A∩(B∪C)   **(3 Marks)**

e. Given:
    $Y = C + I_0 + G_0$
    $C = a + bY$
    Find Y^* and C^* using Cramer's rule   **(4 Marks)**

f. Given the following Consumption and Savings functions for the same economy,
    $C = 40 + 0.8Y$
    $S = -20 + 0.4Y$

    Are these functions in conformity with economic theory? Why?
    (2 Marks)

g. Name and explain the three types of equations in economic models
    (3 Marks)

QUESTION TWO

a) What are the advantages of Mathematics for Economists over literary economics   **(5 Marks)**

b) Given the demand and supply functions of 3 commodities as follows:

    $Qd_1 = 45 - 2P_1 + 3P_2 + 2P_3$
    $Qd_2 = 12 + 2P_1 - P_2 + 2P_3$
    $Qd_3 = 20 - P_1 + 2P_2 - P_3$
    $Qs_1 = -15 + 2P_1$
    $Qs_2 = -8 + 2P_2$
    $Qs_3 = -15 + P_3$
    Calculate the equilibrium prices and quantities of the three commodities
    (10 Marks)

QUESTION THREE

The economy of Karumanzira has three sectors: Agriculture, Industry and Service. Each unit of gross output of Agricultural product (Q_A) requires inputs of 0.3 units of its own product, 0.2 units of Industrial product and 0.4 units of Service sector products. Each unit of gross output of Industrial product (Q_I) requires 0.3 units of its own product, 0.2 units of Agricultural products and 0.2 units of Service sector products. Each unit of gross output of Service product (Q_s) requires 0.2 units of its own product, 0.4 units of Agricultural products and 0.1 units of Industrial product.

   a. What is the general use of the input- output analysis   **(2 Marks)**
   b. What are the assumptions of the input-output model   **(3 Marks)**
   c. Using Leontief Inverse Rule, find the required gross outputs Q_A, Q_I and Q_s when the final demands for Agriculture, Industry and Service sector products are given as 80, 120 and 40 respectively   **(10 Marks)**

QUESTION FOUR

a. A three- sector Economy is represented by the following model:

$$S = -200 + 0.2Y^d$$

$$I = 1400 - 10r$$

$$MD_1 = 0.4Y$$

$$MD_2 = 850 - 15r$$

$$MS = 1900$$

$$G = 1550$$

Compute the equilibrium level of Income (Y^*) and determine the amount of Consumption (C^*) at this Income level   **(7 Marks)**

b. An economy is defined by the following model:

   Y= C + I + G + X - M
   C = c_0 + c_1Y^d Where   Y – National Income
   I = i_1Y C – Consumption
   T = t_0 + t_1Y I – Investment
   G = G_0 G – Government expenditure
   M= m_0 + m_1Y T – Tax
   X = X_0 M – Imports
                                                 X - Exports

   Find equilibrium Income (Y^*) and Consumption (C^*)   **(8 Marks)**

QUESTION FIVE

a. Given the following equations:

          $2x + y - z = 10$
          $X + 3y + 2z = 20$
          $-x + 2y + z = 10$

    Using Matrix Inversion Method, determine the values of x, y and z

                                                          (9 marks)

b. Find the homogeneity of the following functions

       i. $f(x,y) = \dfrac{3x^2 y - x^3}{xy^2 + x^{1.5} y^{1.5}}$ **(3 Marks)**

      ii. $f(x,y,w) = \dfrac{x^2}{y} + \dfrac{2w^2}{x}$ **(3 Marks)**

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