MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS 2018/2019 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: 16TH APRIL, 2019   **TIME: 0830 – 1030HRS**

INSTRUCTIONS TO CANDIDATES

- Question **ONE** is compulsory
- Answer any other **THREE** questions

QUERSTION ONE

a. Define the following terms as used in Mathematics for Economists. Use examples where necessary
   - **i.** Identity Matrix
   - **ii.** Composite Function
   - **iii.** Cofactors in Matrix Operations **(3 Marks)**

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

c. If the Domain of the function $y = 8 + 6x$ is the set $(x/ 2 \leq x \leq 11)$. Find the range of the function and express it as a set **(2 Marks)**

d. Given

   $A = \{2,3,4,6,7,8\}$ $B = \{2,5,6,8,1012\}$ $C = \{1,3,4,5,7,8,9,10,12\}$

   Find $AU(B \cap C)$ **(3 Marks)**

e. Given:
   $$Y = C + I_0 + G_0$$
   $$C = C_o + b(1 - t)Y$$
   Find Y^* and C^* using Cramer's rule **(5 Marks)**

f. Compute

   $f(h(x))$ given $h(x) = (15 - x^2)$ **(2 Marks)**

g. Discuss the properties of Determinants in matrix operations **(6 Marks)**

QUESTION TWO

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

b) Given the following market models, compute the equilibrium price and quantity:

    i. $P = 68 - 4\ Q_d\ -\ Q_d^2$

           $P = 12 + 2\ Q_s\ +\ Q_s^2$

    ii. $Q_d\ =\ \dfrac{a}{p}$

           $Q_s\ =\ bp^2$ **(10 Marks)**

QUESTION THREE

a. Narok county's economy is dependent on three sectors: Agriculture, Industry and Tourism. Each unit of gross output of Agricultural product (Q_A) requires inputs of 0.2 units of its own product, 0.3 units of Industrial product and 0.4 units of Tourism sector products. Each unit of gross output of Industrial product (Q_I) requires 0.1 units of its own product, 0.4 units of Agricultural products and 0.2 units of Tourism sector products. Each unit of gross output of Tourism sector product (Q_T) requires 0.3 units of its own product, 0.4 units of Agricultural products and 0.1 units of Industrial product.

Using Leontief Inverse Rule, find the required gross outputs Q_A, Q_I and Q_T when the final demands for Agriculture, Industry and Tourism sector products are given as 200, 150 and 240 respectively   **(10 Marks)**

b. Using examples discuss the laws of Set Operation   **(5 Marks)**

QUESTION FOUR

a. An economy is characterized by the following equations:

$C = 100 + b(Y - 50 - tY)$

$I = 50$

$G = 50$

$X = 10$

$M = 5 + 0.1Y$

The MPC = 0.8 and the Proportionate Income Tax rate = 0.25

Compute:

   i. The equilibrium national income
   ii. Foreign Trade Multiplier
   iii. Equilibrium value of consumption
   iv. Equilibrium value of imports
   v. Trade Balance   **(8 Marks)**

b. Kiambu county's economy is defined by the following model:

$Y = C + I + G + X - M$

$C = c_0 + c_1 Y^d$ Where   Y – National Income

$I = i_1 Y$ C – Consumption

$T = t_0 + t_1 Y$ I – Investment

$G = G_0$ G – Government expenditure

$M = m_0 + m_1 Y$ T – Tax

$X = X_0$ M – Imports

                                                       X - Exports

Find equilibrium Income (Y*) and Consumption (C*)   **(7 Marks)**

QUESTION FIVE

a. Given the following equations:

$-x + 3y + 2z = 24$

$x + z = 6$

$5y - z = 8$

Using Matrix Inversion Method, determine the values of x, y and z
(9 marks)

b. Determine whether these functions are homogeneous and if so, of what degree:

i. $F(x,y) = \dfrac{x^{1.3} y^{2.6}}{xy^{1.2}}$ **(2 Marks)**

ii. $f(x,y) = \dfrac{3 X^2 Y^2}{XY} + \dfrac{7 XY}{X^2 Y^2}$ **(4 Marks)**

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