UNIVERSITY REGULAR EXAMINATIONS

2013 /2014 ACADEMIC YEAR

1ST YEAR 1ST SEMESTER EXAMINATIONS

(MAIN EXAMINATION)

FOR THE DEGREE OF BACHELOR
EDUCATION (ARTS)

COURSE CODE: ECO 103

COURSE TITLE: MATHEMATICS FOR ECONOMISTS

DATE: 14TH AUGUST, 2014   **TIME:** 9.00 AM – 12.00 NOON

INSTRUCTIONS TO CANDIDATES:

- Answer question **ONE** and any other **THREE** questions from Section B

QUESTION ONE

a) Given the system of matrixes below find:-

   i)   Product   (3mks)

   ii)   The sum   (3mks)

   iii)   Quotient   (3mks)

   iv)   Determinant   (3mks)

$$A = \begin{pmatrix} 1 & \_2 & 3 \\ 2 & 2 & 2 \\ 1 & 2 & 1 \end{pmatrix}$$

$$B = \begin{pmatrix} 3 & 1 & 1 \\ 4 & 2 & 2 \\ 5 & 3 & 1 \end{pmatrix}$$

b) The market situation defined by following demand and supply curves.

Qd = 3 - -25p

Qs = 4 + 12p

When Qd = Quantity demanded

Determine

   i)   Equilibrium quantity Q .   (3mks)

   ii)   Equilibrium price p.   (3mks)

c) Define

   i)   Price elasticity of demand.   (2mks)

   ii)   Monopolistic market structure.   (2mks)

   iii)   Perfect market structure.   (2mks)

d) Given the following total cost function

   Tc = $a + b_1Q + b_2 Q^2 - b_3Q^3$

   Find

   i)   ATC, AFC, AVC, MC.   (6mks)

QUESTION TWO

Using the following national income model:-

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

$C = u + by^d$

$I = r° + \dfrac{r}{R}$

$T = t_o + \dfrac{t}{y}$

$G = G_o \quad x = X_o$

$M = M_o + \dfrac{m}{y}$

Where c = consumption

   I = Investment

   G = Government expenditure

   X = Exports

   M = Imports

i)   Find the equilibrium income.   (5mks)

ii)   What does a, b, t, mo and $\dfrac{m}{y}$ stand for.   (5mks)

iii)   Find the rate of change of equilibrium income with respect of G and R.   (4mks)

iv)   Give value of income at equilibrium if a = 10 b = 0.5 to = 100, ro = 4 $\dfrac{m}{y}$ = 4 I= 2 (1mk)

QUESTION THREE

a)   Draw the cure for the function
      $Y = 4 + 0.1x^2$ (7.5mks)

b)   Work out   (i) $\log_3 (81) (27)$

         (ii) $\log_5 \left(\dfrac{125}{625} \right)$

c) $\dfrac{2x^3 + x^2 - 1}{x^2 - 1}$

(7.5mks)

QUESTION FOUR

In a class of 250 students the courses taken by students are distributed as give below:

Physics = 70

Chemistry = 50

Physics and chemistry = 15

Physics and Biology = 2

Biology = 18

i)   Draw and venn diagram.   (8mks)
ii)   Determine the total number of students =
        (a) Who takes 2 courses only?   (3.5mks)

QUESTION FIVE

Using Cramer's Rule work out the values of X_1, X_2 and X_3.   (15mks)

$2x_1 + 2x_2 - 3x_3 = 24$

$X_1 - 2x_2 + 4x_3 = 36$

$4x_1 + x_2 + 3x_3 = 18$