# KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS 2022/2023 ACADEMIC YEAR**

**FIRST YEAR SECOND SEMESTER EXAMINATIONS MAIN EXAMINATION**

**FOR THE DEGREE OF**

**BACHELOR OF EDUCATION ARTS**

**COURSE CODE: ECO 103**

**COURSE TITLE: MATHEMATICS FOR ECONOMISTS**

**DATE: 12$^{TH}$ APRIL,2023**          **TIME:2.00PM – 4.00PM**

**INSTRUCTIONS TO CANDIDATES:**

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## INSTRUCTIONS TO CANDIDATES

1. Answer a total of **three** questions; question **one** and any other **two** questions.
2. Question **one** carries **30** marks and each of the other two questions carry **20** marks each.

**QUESTION ONE**

a) Discuss five reasons why Economists study Mathematics.                    (10 marks)

b) Define the following terms giving an illustration in each case.

i) Endogenous variables                    (2 marks)

ii) Exogenous variables                    (2 marks)

iii) Economic model                    (2 marks)

c) Given that the demand and supply schedules of a normal commodity in an isolated market

are linear;

a) Formulate using symbols;

    i)   The demand function of the commodity.                    (2marks)

    ii)  The supply function of the commodity.                    (2marks)

    iii) Find the equilibrium price and the equilibrium quantity in simplified form in the

        model assuming such an equilibrium exists.                    (6marks)

d) Use the rules of exponents to simplify the following expressions:

i)   $x^4 \cdot x^3$

ii)  $x^5 \cdot x^{1/2}$

iii) $(x^6)^{-3}$                    (4 Marks)

iv) $x^{-2} \div x^{-7}$

**QUESTION TWO**

a) Given the universal set T and its subsets A and B

$T = \{1,2,3,4,5,6,7,8\}$

$A = \{3,4,5,6\}$

$B = \{1,3,4,7,8\}$                    (4marks)

Determine the intersection of A and B

b) Consider the universal set T and its subsets A, B and C below

$T = \{a, b, c, d, e, f\}$
$A = \{a, d\}$
$B = \{b, c, f\}$
$C = \{a, c, e, f\}$

Find
    i)   $A \cup B$                                                     (2marks)
    ii)  $A \cup C$                                                     (2marks)
    iii) $B \cup C$                                                     (2marks)
    iv)  $A \cup B \cup C$                                            (4marks)

c) There are two different methods of representing members of a set. Discuss them giving an example in each case.
    i)      Descriptive method                                  (3marks)
    ii)     Enumerative method                               (3marks)

## QUESTION THREE

a) The following model refers to a hypothetical economy.
$Y = C + I_0 + G_0$
$C = 20 + 5Y^{1/2}$
$I_0 + G_0 = 30$
Compute the equilibrium income and the equilibrium consumption for the economy. (12 marks)

b) Given the Keynesian National Income model

    $Y = C + I_o + G_o$, where $C = a + bY^d$, $Y^d = Y - T$. Derive the equilibrium conditions for Y

    and C in terms of a and b.                                             (8

    marks)

## QUESTION FOUR

a) Define the IS curve and illustrate it diagrammatically.            (4 marks)

b) Solve the system of linear equations using substitution method.       (6 marks)

$2x - 3y = 8$
$3x + 4y = -5$

c) Discuss four main characteristics of the Consumption function and MPC.     (8marks)

d) Given the consumption function $C = 73 + 0.75Y^d$, determine the MPC.     (2marks)

**QUESTION FIVE**

The following equations describe an economy.

$Y = C + I + G$

$C = 120 + 0.5(Y - T)$

$I = 100 - 10r$

$G = 50$

$T = 40$

$(M/P)^d = Y - 20r$

$M = 600$

$P = 2$

a) Identify each of the variables and briefly describe their meanings. (10Marks)

b) From the above list, use the relevant equations to derive the IS curve. Graph the IS curve on an appropriately labelled graph. (5 Marks)

c) From the above list, use the relevant set of equations to derive the LM curve. Graph the LM curve on the same graph you used in part (ii) above. (5 Marks)