THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

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MAIN EXAMINATION

MAY – JULY 2016 TRIMESTER

FACULTY OF COMMERCE

DEPARTMENT OF ACCOUNTING AND FINANCE

REGULAR PROGRAMME

CID 072: FOUNDATIONS OF BUSINESS MATHEMATICS

Date: JULY 2016	**Duration: 2 Hours**
INSTRUCTIONS: Answer Question ONE and ANY OTHER TWO Questions	

Q1. a) Find the value of x and y using the matrix inverse method
$2x + 3y = 12$
$4x – 5y = 2$ **(4 marks)**

b) For each of the following statements include whether it is TRUE or FALSE
i A singleton set has infinite number of elements
ii Sets are useful in solving logical counting problems.
iii The empty set is a subset of every set
iv Set of even integers is a finite set
v Set of all cars in Kenya is a well defined set. **(5 marks)**

c) A bus travels from Nairobi to Mutito Andei at a speed of x km/h a distance of 320km. If the speed is reduced by 20km/h the bus will take 48 minutes more. Represent the information as a quadratic equation and solve using the formular method **(5 marks)**

d) Using the laws of logarithms and exponents solve the following
i Solve for x given $\text{Log}_3\ 9 = x$ **(1 mark)**
ii $\text{Log}_x\ 8 = 3$ **(1 mark)**
iii $(x^{-3})^6$ **(1 mark)**
iv $4{,}000^0$ **(1 mark)**

e) Define the following terms as used in logic analysis and give an example in each.

i Logic
ii Statement **(4 marks)**

f) In each of the following sentences determine which is a statement (S) or not (N)
i Every rectangle is a square
ii The sum of three angles of a triangle is 180^0
iii How are you?
iv 2 +1 = 3

v $\sqrt{2}$ is a rational number **(5 marks)**

g) A shopkeeper has articles for sale. After selling a number of articles at sh 5, he sells the remainder at sh 4 each and his total receipts are £ 11 pounds. If total receipts come to £11 and sh 10 calculate the number sold at each of the prices and the number of articles sold together in total. **(3 marks)**

Q2. a) How is set theory useful in business. **(3 marks)**

b) A survey was taken on 1000 children in Daadab refugee camp and the following results were obtained.
320 children were fed on beans
200 children were fed on rice
450 children were fed on potatoes
150 children were fed on beans and potatoes
70 children were fed on beans and rice
100 children were fed on rice and potatoes
300 children were fed on none of the three types of food

Required
i Present the above information in the form of a venn diagram. **(5 marks)**

ii The number of children who were fed on all the three types of food. **(3 marks)**

iii The number of children who were fed on exactly one of the three types of food. **(3 marks)**

iv The number of children who were fed on at least two types of food. **(2 marks)**

c) Solve the following quadratic equation using the formula method
$y = 31.5x – 3x^2 – 60$ **(2 marks)**

d) Explain what is complement of a set and disjoint set. **(2 marks)**

Q3. a) Explain the following terms as used in Markov analysis
i Transition matrix
ii Initial market vector
iii Steady equilibrium vector **(6 marks)**

b) Two mobile phone companies, Safaricom and Airtel have market shares as 60% and 40% respectively in a certain region. After vigorous advertising by both companies 40% of the Safaricom subscribers switched to Airtel and the rest remained with Safaricom while 20% of Airtel subscribers switched to Safaricom and the rest remained in Airtel after every month.

Required
i Form a probability transaction matrix **(2 marks)**

ii Find the proportion of a market share for each month after months **(4 marks)**

iii Find the proportion of market share of each product in the long run **(4 marks)**

c) Solve the following simultaneous equations using crammers rule method
$2x + 3y = 12$
$4x – 5y = 2$ **(4 marks)**

Q4. a) Using crammers rule find the value of x, y and z
$4x – 2y + 3z – 20 = 0$
$2y – 2.5z – 2x + 16 = 0$
$-1.5z + 4x – 2y -2 = 0$ **(5 marks)**

b) State TWO assumptions of input output model **(2 marks)**

c) An economy depends on two basic products wheat and oil. To produce one metric tone of wheat, it requires 0.25 metric tones of wheat and 0.3 metric tones of oil. To produce one metric tones of oil it requires 0.08 metric tones of wheat and 0.11 metric tones of oil. Find the production which will satisfy the demand of 1000 metrics of wheat and 2000 metrics of oil. **(5 marks)**

d) Given sets A, B, and C in a universal set U which consists of the whole numbers 0 to 9 are given as

A { 0,1,2} B {1,2,3,4} C{0,3,4,5}

Required

With the help of venn diagrams illustrate the following (where applicable)

i BnC **(2 marks)**

ii A nBnC **(2 marks)**

iii A^1 **(2 marks)**

iv (A-B) nC **(2 marks)**

END