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MAIN EXAMINATION

AUGUST - DECEMBER 2016 TRIMESTER

FACULTY OF ARTS AND SOCIAL SCIENCES

DEPARTMENT OF SOCIAL SCIENCES

REGULAR PROGRAMME

SEC 102: INTRODUCTION TO MATHEMATICS FOR ECONOMISTS

Date: DECEMBER 2016	**Duration: 2 Hours**
INSTRUCTIONS: Answer Question ONE and ANY other TWO Questions	

Question 1

a.) Describe the following sets using the list method and give the set Cardinality:

i. A = {x/x is a natural number which is 1 less than a multiple of 3} **(2 Marks)**

ii. B = {y/y is a rational number whose value is 1/3} **(2 Marks)**

Iii C = {n/n is a vowel that appears in the phrase "set of consonants"} **(2 Marks)**

Iv D = {z/z is an even prime number greater than 2} **(2 Marks)**

b.) Given a universal set: U = {1, 2, 3, 4, 5, 6},
And Sets: A = {1, 2, 3}; B = { 3, 4, 5, 6}. Find:

A n B;

ii. A U B;
iii. B – A;
iv. B' **(4 Marks)**

v. Represent your answers in "b" above by a Venn diagram in each case. **(3 Marks)**

c.) Given a set S = {0, 1, 2},

Find:

i. P(S) **(4 Marks)**
ii The Cardinality of set S. **(1 Mark)**

d.) Statements A and B are defined as follows:

A = The Airways is operating at a loss
B = The Airways will shut down its office.

Use various set symbols to represent the following statements:

i. The Airways is operating at a loss and it will shut down its office **(5Marks)**

ii The Airways is operating at a loss, but it will not shut down its office. **(5Marks)**

Question 2

a.) Let x and y be rational and irrational numbers respectively,

i. Is x + y, necessarily an irrational number? Give an example in support of your answer. **(5 marks)**

Ii Is x.y necessarily an irrational number? Justify your answer **(5 Marks)**

b.) Plot the following real number sets:

i. A = { Whole numbers} **(3 Marks)**
ii. B = { Intergers} **(3 Marks)**
iii. A n B. **(4 Marks)**

Question 3

a.) Use any exponents' and/or logarithms' rules to simplify the following:

i. $x = y^{1/4} \times y^{3/4}$ **(1.5 marks)**

ii. $y = x^2 / X^{3/2}$ **(1.5 marks)**

iv. $n = (x^{3/4})^8$ **(1.5 marks)**

v. $M = x^2y^3 / x^4y$ **(1.5 marks)**

iii. $x = \log_3 9$ **(1.5 marks)** vi. $X = \log_4 2$ **(1.5 marks)**

b.) Find the value of x in log form:

I. $5^x = 2(3)^x$ **(5 Marks)**

II. If Kenya's National Income was 3 trillion in 2014; and assume that it grew at 4% per year; what will be Kenya's National Income in the year 2034?

(6 Marks)

Question 4

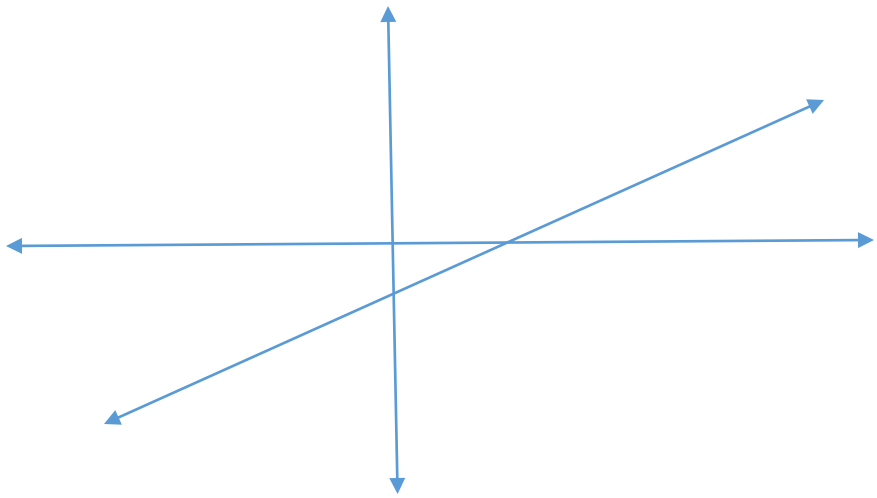
a.) i. Distinguish between a "Relation" and a "Function" **(2 Marks)**

ii Relations can be written in several ways; ordered pairs, table, graphs, or mapping. Give examples of each of these ways.

(6 Marks)

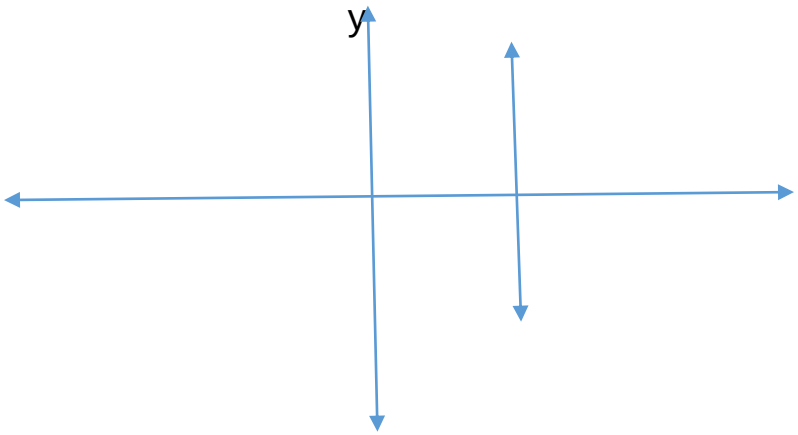
b) Does the following graph represent a function? If yes, name the domain and range.

i.



(2 marks)

ii.



(2 marks)

c) Find the value of x in the following functions:

i) $f(x) = x - 2$ **(2 marks)**
ii) $f(x) = 2x + 3$; find $f(-2)$ **(2 marks)**
iii. $f(x) = x^2 - x + 7$; find $f(2y)$ **(2 marks)**
iv. $f(x) = x^2 - 3$; find $f(a - 1)$ **(2 marks)**

Question 5.

a.) i. Solve the following simultaneous equations by graphical method:

$4x + 3y = 11$
$4x + y = 5$ **(2 Marks)**

ii. Given the demand and supply equations below:

$Qd = 30 - P$

$Qs = -20 + 3P$

Where:

Qd is quantity demanded

Qs is quantity supplied, and P is the price level. If the equilibrium in the market is attained when Qd = Qs; what is the equilibrium quantity and equilibrium price? **(8 Marks)**

b.) Find the derivatives of the following equations:

i. $y = (x^2 + 3)\ (2x^3 + x^2 - 3)$ **(5 Marks)**

ii. $y = x^{1/2} / 2 + x^5$ **(5 Marks)**

END