KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS

ACADEMIC YEAR

First YEAR FIRST SEMESTER

MAIN EXAMINATION

FOR THE DEGREES OFBACHELOR OF EDUCATION ARTS AND BACHELOR OF EDUCATION SCIENCE

COURSE CODE: ESM 101

COURSE TITLE: QUANTITATIVE SKILLS I

DATE: 10/1/2018   **TIME**: 9.00-11.00 a.m.

INSTRUCTIONS TO CANDIDATES

Instructions to Candidates: Answer Question ONE and any other TWO Questions

TIME: 2 Hours

This Paper Consists of 4 Printed Pages. Please Turn Over. ▶

Question 1

Question 1

a) Distinguish between the following

    i) a whole number and an integer   (2mks)

    ii) a row matrix and a column matrix   (2mks)

    iii) a disjoint set and a comparable set   (2mks)

b) Kisumu is 324km from Nairobi. A train takes 6 hours from Nairobi to Kisumu at an average speed of ykm/hr. The return journey is uphill, so the train reduces the speed by 7.7km/hr and takes x hours more to get to Nairobi. Find the value of x, and y.   (5mks)

c) Find the inverse of; $\begin{bmatrix} 3 & -4 \\ 2 & 7 \end{bmatrix}$

Hence or otherwise solve the following simultaneous equations:

$$3x - 4y = -6$$
$$2y + 7y = 25$$

                                             (5mks)

d) Simplify $\dfrac{3x^2 - 9x + 6}{2x^2 - 4x + 2}$

                                             (5mks)

e) By use of graphical method, find the maximum possible value of y given that;

$y = 6x + 7 - x^2$ (Take $-1 \leq x \leq 7$)   (5mks)

f) Given $A = \begin{bmatrix} 2 & 8 & -4 \\ 9 & 0 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & 1 \\ 0 & 5 \\ 4 & -3 \end{bmatrix}$

Determine $A^T \times B^T$ (4mks)

Question 2

Given the matrix; $A = \begin{bmatrix} 5 & 3 & 5 \\ 1 & 2 & 1 \end{bmatrix}$

$$3 \qquad -4 \qquad -2$$

a) Determine

        i)   the determinant of A   (3mks)

        ii) the co-factor matrix of A   (5mks)

        iii) the inverse of A   (3mks)

b) Solve the following system of simultaneous equations.

$$5x + 3y + 5z = 6$$

$$x + 2y + z = 4$$

$$3x - y - 2z = -3 \qquad\qquad\qquad\qquad (6mks)$$

    c) State any **three** components of a time series   (3mks)

Questions 3

There are 960 girls in Mumias Girls School. The girls are allowed to enroll in any of the three games and compete for the school. The three games are netball, basketball and hockey. Given that 320 play netball, 490 play basketball and 440 play hockey. Also 150 play both netball and basketball. 170 play netball and hockey, and 140 play basketball and hockey. Given that 80 played all three games, By using Venn diagrams determine:

    a) Present the information on a Venn diagram   (5mks)

    b) Determine the number of girls who:

    i) Played only one game.   (3mks)

    ii) played two and only two games   (3mks)

    iii) Neither played netball nor basketball.   (3mks)

    iv) Either played netball or hockey.   (3mks)

    v) Did not play any game.   (3mks)

Question 4

The following are marks obtained by pupils in a mathematics test.

44	40	37	36	39	37	45	40	43	41
38	41	36	40	42	38	37	41	42	37
37	40	42	40	41	40	39	40	39	43
39	43	40	39	37	41	41	38	42	38

a) Make a frequency distribution table using class intervals 35 – 37, 38 – 40...   (4mks)

b) Calculate the mean, mode and median mark.   (8mks)

c) Comment on the performance in the test.   (3mks)

d) Calculate the standard deviation.   (5mks)

Question 5

The data given below represents milk sales by a certain farmer in thousands of litres per annum.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sales	240	270	290	330	210	130	130	120	110	140

Using the above information calculate:-

a) i) The 3 yearly moving averages.   (4mks)

   ii) The 5- yearly moving averages.   (4mks)

b) plot the 3- yearly and the 5- yearly moving averages on the same plane   (5mks)

c) On the same graph, plot the milk sales and show the trend line using the method of semi averages   (5maks)

d) Comment on the milk sales   (2mks)