



(Knowledge for Development)

# **KIBABII UNIVERSITY**

**UNIVERSITY EXAMINATIONS  
2016/2017 ACADEMIC YEAR  
FIRST YEAR THIRD SEMESTER  
MAIN EXAMINATION**

**FOR THE DEGREES OF**

**EDS, BJM, BEE, BAF, EDA, BCOM, BIT, BSW & BCH**

**COURSE CODE: ESM 101**

**COURSE TITLE: QUANTITATIVE SKILLS 1**

**DATE: 14<sup>TH</sup> SEPTEMBER, 2017**

**TIME: 2:00pm-4:00pm**

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## **INSTRUCTIONS TO CANDIDATES**

Answer Question One and any other TWO (2) Questions

TIME: 2 Hours

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

**QUESTION ONE (30 MARKS)**

a) Simplify the fraction  $\frac{\frac{1}{2} \div (\frac{2}{3} - \frac{1}{5}) \text{ of } \frac{4}{9}}{15}$  (3 marks)

b) In an agricultural research centre, the length of a sample of 50 maize cobs were measured and recorded as shown in the frequency distribution table below.

Length in cm	Number of cobs
8 – 10	4
11 – 13	7
14 – 16	11
17 – 19	15
20 – 22	8
23 - 25	5

Calculate the mean and the mean absolute deviation of the distribution (10 marks)

c) Determine all possible values of x and y given that (4 marks)

$$A^2 = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \quad \text{and} \quad A = \begin{pmatrix} x & 0 \\ 5 & y \end{pmatrix}$$

d) Solve the equation

$$\frac{x+3}{x+5} = \frac{4}{5} \quad (3 \text{ marks})$$

e) The following data was obtained for sales in the period 1980-1990 for a business in up market. Complete the table by finding moving averages of order 3 and order 5 for the data. (8 marks)

year	sales	Moving totals of order 3	Moving average of order 3	Moving totals of order 5	Moving average of order five
1980	10				
1981	20				
1982	30				
1983	40				
1984	50				
1985	40				
1986	30				
1987	20				
1988	30				
1989	40				
1990	50				

f) Without mentioning four, six and eight, express in another way

$$P = \{4,6,8\}$$

(2 marks)

### QUESTION TWO (20 MARKS)

a) There were 36 people in a party of tourists visiting East Africa. Of these 24 visited Lake Magadi and 26 Lake Victoria. If each of the 36 went to at least one Lake, Use a Venn diagram to find how many visited both. (2 marks)

b) The sets L, M and N in a universal set consisting of the first 10 lower case letter of the alphabetical set are  $L = \{a,b,c\}$ ,  $M = \{a,b,c,e\}$  and  $N = \{a,d,e,f\}$ . Determine the members of the following sets:

- i)  $M \cup N$  (2 marks)
- ii)  $L \cup N$  (2 marks)
- iii)  $L'$  (2 marks)
- iv)  $L \cap M \cap N'$  (2 marks)
- v)  $(L \cup M \cup N)'$  (2 marks)
- vi)  $M \cap N$  (2 marks)
- vii)  $M \cap N \cap L'$  (2 marks)
- viii)  $(M \cap N \cap L)'$  (2 marks)

### QUESTION THREE (20 MARKS)

a) Evaluate  $\frac{1}{3}$  of  $(2\frac{3}{4} - 5\frac{1}{2}) \times 3\frac{6}{7} \div \frac{9}{4}$  (3 marks)

b) Factorize completely  $3x^2 - 2xy - y^2$  (4 marks)

c) Solve simultaneously

$$2x - y = 3$$

$$x^2 - xy = -4$$

(3 marks)

- d) Draw the graph of  $y = x^2 - x - 6$  for  $-3 \leq x \leq 4$  and use it to solve  $x^2 + 2x - 2 = 0$  (10 marks)

#### QUESTION FOUR (20 MARKS)

The table below shows the age of patients at a health center on a Monday

Age	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-49
Frequency	4	8	15	12	3	4	2	1

Use the data to

- Draw a histogram hence estimate the mode of the distribution. (4 marks)
- Draw an ogive hence estimate the median of the distribution (4 marks)
- Compute the distribution's standard deviation (9 marks)
- Comment on the standard deviation obtained in (iii) above (3 marks)

#### QUESTION FIVE (20 MARKS)

- a) Given the matrix  $\begin{pmatrix} -1 & 5 & -3 \\ 5 & 0 & 4 \\ -3 & 4 & 9 \end{pmatrix}$

Find its transpose and determinant

(6 marks)

- b) Use Cramm's rule to solve

$$x + y + 2z = -1$$

$$x + 2y + z = 3$$

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

(10 marks)

- c) Use the inverse method to solve  $2x + 3y = 13$

$$3x - y = 3$$

(4 marks)