



KIBABII UNIVERSITY COLLEGE (KIBUCO)

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2014 /2015 ACADEMIC YEAR**

FIRST YEAR FIRST SEMESTER EXAMINATIONS

MAIN EXAMINATION

FOR THE DEGREE

OF

BACHELOR EDUCATION (ARTS)

COURSE CODE: ESM 101

COURSE TITLE: QUANTITATIVE SKILLS 1

DATE: 18TH DECEMBER, 2014

TIME: 2.00-4.00 P.M

INSTRUCTIONS TO CANDIDATES:

Answer Question ONE and any other Two Questions

TIME: 2 Hours

1 (a) Compute the mean of the following set of scores. 2, 3, 7, 7, 8, 8, 8, 9 and 11.

Hence calculate the variance and standard deviation (6 marks)

(b) Given the matrix $M = \begin{pmatrix} 3 & 2 \\ 4 & 5 \end{pmatrix}$ and $P = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$

Calculate the matrices M^{-1} and $M^{-1}P$

Hence solve the equations

$$3x + 2y = 5$$

$$4x + 5y = 2 \quad (6 \text{ marks})$$

(c) Given the sets $A = \{a, b, c\}$ and $B = \{b, d\}$ find

(i) $A - B$

(ii) $B - A$

(iii) $A \cap A$

(iv) $A \cup B$

(v) $A \cap B$

(5 marks)

(d) Explain two reasons why we should look at each factor influencing a time series one at a time

(6 marks)

(e) Identify seven principles of graph construction

(7 marks)

SECTION B (ANSWER ANY TWO QUESTIONS)

2 (a) Given $P = \begin{pmatrix} 3 & -4 \\ -2 & 3 \end{pmatrix}$, find matrix A, given that $AP = I$, where I is the identity matrix (3 marks)

(b) if $A = \begin{bmatrix} 2 & 3 & 5 \\ 1 & 7 & 4 \\ 8 & 0 & 6 \end{bmatrix}$

Find A^T and determine the matrix product $A^T \cdot I$ (3 marks)

(c) if $A = \begin{pmatrix} 1 & 2 \\ -1 & 3 \end{pmatrix}$. Verify that

$$A^2 - 4A + 5I = 0 \quad (5 \text{ marks})$$

(d) Use Cramers rule to solve the following system of equations

$$2x_1 - x_2 + 3x_3 = 2$$

$$x_1 + 3x_2 - x_3 = 11$$

$$2x_1 - 2x_2 + 5x_3 = 3$$

(9 marks)

3 (a) The following data represents marks obtained by pupils of form two in a mathematics test.

35,54,59,50,50,61,52,57,60,58

38,55,57,65,54,70,58,59,61,56

40,63,59,50,60,50,67,69,60,71,

48,57,62,59,63,51,58,64,50,67

62, 42, 49

60, 36, 50

65, 45

49, 47

- (i) Prepare a grouped frequency distribution table for the above data using a class size of $i=5$ (3 marks)
- (ii) Hence calculate the mean and the median (6 marks)
- (iii) Using the above data draw a frequency polygon and a cumulative frequency curve (6 marks)

(b) Calculate the quartile deviation of the following set of data (5 marks)

28,30,32,32,33,33,34,35,37

4. Define the following terms

- (i) Graph (2 marks)
- (ii) Presentational graphs (2 marks)
- (iii) Mathematical graphs (2 marks)

(b) Let $y=x^2-5x+2$. Complete the following table and draw the graph of the function

x	-1	0	1	2	3	4	5
x^2							
$-5x$							
2							
y							

Use the graph to solve the following equations

- (i) $x^2 - 5x + 2 = 0$
- (ii) $x^2 - 5x + 3 = 0$
- (iii) $x^2 - 4x + 3 = 0$ (8 marks)

(c) Explain the following factors concerning presentational graphs

(i) Curve thickness (3 marks)

(ii) Time series plots (3 marks)

5 (a) use common logarithm tables to work out the value of

$$\frac{9.3}{2.9 \times 1.7} \quad (4 \text{ marks})$$

(b) Work out the value of

$$\frac{1}{8} \text{ of } \frac{1}{2} \div \frac{1}{5} + \frac{1}{3} \quad (4 \text{ marks})$$

(c) Write out the following sets in the form $\{x : x \text{ obeys a rule}\}$

(i) $A = \{1, 2, 3, 4\}$ (2 marks)

(ii) $B = \{2, 3, 5, 7, 11\}$ (2 marks)

(iii) $C = \{4, 9, 16, 25\}$ (2 marks)

(iv) $D = \{-2, -1, 0, 1, 2\}$ (2 marks)

(d) Define the following

(i) An empty set (1 mark)

(ii) Equivalent set (1 mark)

(iii) Subset (1 mark)

(iv) Universal set (1 mark)