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**KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR**  
**FOR THE CERTIFICATE IN HOSPITALITY MANAGEMENT**  
**CHM 203: BASIC MATHEMATICS**

Date: 13<sup>TH</sup> DECEMBER 2023

Time: 8:30AM-10:30AM

**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE (30 MARKS)**

- a) Find the standard deviation of the following average temperatures recorded over a five-day period last month; 18, 22, 19, 25, 12 (3 Marks)

- b) Solve the following simultaneous equation by elimination method;

$$\begin{aligned}2x + 3y &= 8 \\3x - y &= 23\end{aligned}\quad (3 \text{ Marks})$$

- c) Given the matrices  $A = \begin{pmatrix} 1 & -1 \\ 4 & -1 \end{pmatrix}$ ,  $B = \begin{pmatrix} 1 & -2 \\ 2 & -2 \end{pmatrix}$ , determine  $(AB)^{-1}$  (3 Marks)

- d) Solve the quadratic equation below by using the Quadratic Formula:

$$2x^2 + 9x - 5 = 0 \quad (3 \text{ Marks})$$

- e) Find the median of the following data;

Maths marks	60-65	65-70	70-75	75-80	80-85	85-90	90-95
No. of students	8	12	14	8	5	6	4

(3 Marks)

- f) A bag contains 4 red marbles, 6 blue marbles, and 8 green marbles. One marble to be drawn at random from the bag;

- i) Draw a tree diagram to represent the information. (2 Marks)

- ii) What is the probability that the picked marble will be green? (3 Marks)

- g) Solve the following simultaneous equations using substitution method

$$\begin{aligned}4x - 2y &= 4 \\5x + 3y &= 16\end{aligned}\quad (3 \text{ Marks})$$

- h) The table below shows the distribution of marks out of 100 in a statistics test

Class interval	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
Frequency	5	3	4	7	2	6	13

Calculate the;

- i) Mode (3 Marks)

- ii) First quartile (4 Marks)

### **QUESTION TWO (20 MARKS)**

a) The table below shows the distribution of marks of 40 students in statistics cat:

<b>Class-interval</b>	0–5	5–10	10–15	15–20	20–25	25–30
<b>Frequency</b>	5	3	9	10	8	5

Calculate the;

- i) Mean (2 Marks)
- ii) Variance (3 Marks)
- iii) Standard deviation (2 Marks)

b) Find the value of  $x$  in the matrix below if its determinant has a value of  $-12$

$$\begin{pmatrix} -4 & 2 \\ -8 & x \end{pmatrix} \quad (4 \text{ Marks})$$

c) Solve the following quadratic equation by factorization method:

$$3x^2 - 23x + 40 = 0 \quad (4 \text{ Marks})$$

d) A shoe shop has recently had an end-of-season sale. They have sold trainers in sizes 6, 7, 4, 7, 7, 6, 4, 6, 5. Calculate the;

- i) Median shoe size?
- ii) Range
- iii) Mode (5 Marks)

### **QUESTION THREE (20 MARKS)**

a) Given the matrices  $A = \begin{pmatrix} -3 & 1 \\ 6 & -4 \end{pmatrix}$ ,  $B = \begin{pmatrix} -14 & -2 \\ -6 & -3 \end{pmatrix}$  and  $C = \begin{pmatrix} 8 & 24 \\ -4 & -12 \end{pmatrix}$ , determine;

- i)  $5A + 2B$  (3 Marks)
- ii)  $BC^{-1}$  (3 Marks)
- iii)  $B^{-1}$  (3 Marks)
- iv)  $B^{-1} + C^T$  (3 Marks)

b) Draw a cumulative frequency curve (ogive) to represent the following frequency distribution: (4 Marks)

<b>Class interval</b>	<b>Frequency</b>
20–25	5
25–30	10
30–35	18
35–40	14
40–45	12

c) Doris has 17 coins in her purse that have a total value of Ksh.115. If she has only 5 and 10 shillings' coins, how many of each are there? (4 Marks)

### **QUESTION FOUR (20 MARKS)**

a) A bag contains 5 red balls, 3 blue balls and 4 yellow balls. Two balls are drawn at random one after the other without replacement.

- i) Draw a tree diagram to illustrate his pickings. (3 Marks)
- Calculate the probability that;
- ii) Both balls picked were red. (3 Marks)
  - iii) Both balls picked were of the same colour. (3 Marks)
  - iv) There was no red ball from the two balls picked. (3 Marks)

- b) Solve the two simultaneous linear equations below by matrix method;  
 $2x + 3y = 13$   
 $5x + 3y = 16$  (4 Marks)
- c) Solve the following quadratic equation by completing the square;  
 $x^2 + 10x - 4 = 0$  (4 Marks)

**QUESTION FIVE (20 MARKS)**

- a) The marks obtained by 50 students of class 10 out of 80 marks are given in the following frequency distribution.

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	2	5	8	16	9	5	3	2

Determine the;

- i) First quartile (3 Marks)  
 ii) Third quartile (3 Marks)  
 iii) Quartile deviation (4 Marks)
- b) Solve the quadratic equation below by using the formula method;  
 $x^2 + x - 12 = 0$  (3 Marks)
- c) Solve the following simultaneous linear equations by elimination method;  
 $4x - y = -3$   
 $3x - y = -1$  (3 Marks)
- d) Draw the histogram for the following frequency distribution; (4 Marks)

Class-Interval	Frequency
0-5	5
5-10	8
10-15	15
15-20	4
20-25	10