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**KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**UNIVERSITY EXAMINATION, 2024/2025 ACADEMIC YEAR**  
**FIRST YEAR, FIRST SEMESTER EXAMINATION**  
**FOR THE CERTIFICATE IN HOSPITALITY MANAGEMENT**  
**CCU 004: BUSINESS CALCULATIONS AND STATISTIC**

Date: 17<sup>TH</sup> APRIL 2024

Time: 11:30AM-1:30PM

**INSTRUCTIONS TO CANDIDATES**

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

**QUESTION ONE (30 MARKS)**

- a) Find the standard deviation of the numbers;  
6, 7, 8, 5, 9 (3 Marks)

- b) Solve the following simultaneous equations given below by elimination method;  
 $2x+4y=14$   
 $4x-4y=4$  (3 Marks)

- c) Given two matrices  $A$  and  $B$ :  
 $A = \begin{bmatrix} 5 & 6 \\ 2 & 3 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 3 \\ 2 & 9 \end{bmatrix}$   
Determine the following;  
i. Transpose of  $A$  (1 Mark)  
ii.  $AB$  (2 Marks)  
iii.  $B^T + A$  (2 Marks)

- d) Solve the quadratic equation below by using the factorization formula:  
 $x^2+12x+35=0$  (3 Marks)

- e) Given following data:

Class	10-14	15-19	20-24	25-29	30-34
Frequency	7	11	14	13	5

Determine:

- i. Mean (2 Marks)  
ii. Mode (2 Marks)  
iii. Median (2 Marks)
- f) A bag contains 4 red marbles, 6 blue marbles, and 8 green marbles. Two marbles are to be drawn at random from the bag one at a time (without replacement);  
i. Draw a tree diagram to represent the information. (2 Marks)  
ii. What is the probability that the picked marbles are both green? (2 Marks)

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

Class-interval	0-5	5-10	10-15	15-20	20-25	25-30
Frequency	5	3	9	10	8	5

Calculate the:

- i. Quartile deviation (4 Marks)  
ii. Variance (2 Marks)

### QUESTION TWO (20 MARKS)

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

<b>Class interval</b>	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80-90	90-100	100-110
<b>Frequency</b>	4	5	7	13	16	11	9	6	4	3

Calculate the;

- i. Mode (3 Marks)
- ii. Semi-interquartile range (5 Marks)

b) Given the matrix  $\begin{bmatrix} -4 & 2 \\ -8 & x \end{bmatrix}$ . Find the value of  $x$  if its determinant is  $-12$ . (3 Marks)

c) Solve the following quadratic equation by completing the square method: (3 Marks)

$$3x^2 + 30x + 27 = 0$$

- d) A suit shop has recently had an end-of-season sale. They have sold suits in sizes 19, 13, 18, 14, 12, 25, 11, 10, 17, 23, 19. Calculate the;
- i. Median suit size? (2 Marks)
  - ii. Range (1 Mark)
  - iii. Mode (1 Mark)
  - iv. Mean (2 Marks)

### QUESTION THREE (20 MARKS)

a) Given three matrices  $A$ ,  $B$  and  $C$  below:

$$A = \begin{bmatrix} -1 & 3 \\ -2 & 4 \end{bmatrix}, B = \begin{bmatrix} -2 & 3 \\ 1 & -4 \end{bmatrix}, C = \begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix}$$

Find;

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

b) Draw a histogram to represent the following frequency distribution:

100-104	105-109	110-114	115-119	120-124	125-129	130-134
2	8	18	13	7	1	1

(4 Marks)

- c) A bag contains three black and two yellow balls. A man draws two at random without replacement. What is the probability that both balls are yellow? (2 Marks)
- d) Consider the following set of numbers: 87, 31, 48, 64, 93, 32, 11, 51, 93, and 85. Calculate:
- i. Mean (2 Marks)
  - ii. Variance (2 Marks)
  - iii. Standard deviation (2 Marks)

### QUESTION FOUR (20 MARKS)

a) At a certain assembly plant, three machines make 30%, 45%, and 25%, respectively, of the products. It is known from the past experience that 2%, 3% and 2% of the products made by each machine, respectively, are defective. Now, suppose that a finished product is randomly selected.

- i. What is the probability that it is defective? (3 Marks)
- ii. If a product were chosen randomly and found to be defective, what is the probability that it was made by machine 3? (2 Marks)

b) A bag contains 3 white and 4 black balls. A man picks 2 at random. What is the probability of picking 2 black balls? **(3 Marks)**

c) Solve the following simultaneous linear equations using matrix method.

$$x + 2y = 4$$

$$3x - 5y = 1$$

**(4 Marks)**

d) Solve the following quadratic equation by completing the square;

$$x^2 - 10x - 24 = 0$$

**(4 Marks)**

e) A pizza restaurant charges ksh 1200 for a large pizza and ksh 800 for a small pizza. If a customer buys 5 pizzas in total, and it costs ksh 5200, how many large pizzas did they buy?

**(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.

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

Determine the following;

**i.** Quartile deviation

**(4 Marks)**

**ii.** Mean

**(3 Marks)**

**iii.** Mode

**(2 Marks)**

b) Solve the quadratic equation below by using the formula method;

$$x^2 + 12x + 35 = 0$$

**(3 Marks)**

c) Solve the following simultaneous linear equations by elimination method;

$$4x - y = -3$$

$$3x - y = -1$$

**(3 Marks)**

d) Draw a cumulative frequency curve(ogive) to represent the following frequency distribution

e)

<b>Class interval</b>	<b>Frequency</b>
40-50	2
50-60	5
60-70	10
70-80	7
80-90	9
90-100	4

**(5 Marks)**

