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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2024/2025 ACADEMIC YEAR
SECOND YEAR, SECOND SEMESTER EXAMINATION
FOR THE CERTIFICATE IN BANKING AND FINANCE
CCU 004 – BUSINESS CALCULATIONS AND STATISTICS

Date: 17th 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:
$$A = \begin{bmatrix} 5 & 6 \\ 2 & 3 \end{bmatrix} \text{ and } B = \begin{bmatrix} 1 & 3 \\ 2 & 9 \end{bmatrix}$$
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

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

Calculate the;

   i)   Mode   (3 Marks)
   ii)   Semi-interquatile 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:

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

          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.

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 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;

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

(5 Marks)