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

Date: 15TH AUGUST 2023
Time: 11:30AM-1;30PM

INSTRUCTIONS TO CANDIDATES
ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS
QUESTION ONE (30 MARKS)

a) Given the matrices A=$\begin{pmatrix} 8 & 1 \\ -2 & 3 \end{pmatrix}$, B=$\begin{pmatrix} 1 & -4 \\ 2 & 2 \end{pmatrix}$, determine (AB)$^{-1}$. (4 Marks)

b) Solve the quadratic equation $3x^2 - 5x - 7 = 0$ using quadratic formula. (3 Marks)

c) Solve using inverse matrix method;
$$3x - 4y = -9$$
$$4x - 5y = 12$$
(3 Marks)

d) Given the following set of data; 15, 10, 23, 16, 8, 17, 10. Determine;
   i)   Median (2 Marks)
   ii) Mode (1 Mark)
   iii) Variance (3 Marks)

e) Solve using the elimination method the following simultaneous equations; (3 Marks)
$$y + 2x = 4$$
$$3x - y = 1$$
(3 Marks)

f) Discuss two methods of data collection and state one advantage for each. (4 Marks)

g) A basket contains four oranges, three mangoes and five apples. Two fruits are selected randomly without replacement from the basket. What is the probability that;
   i)   The second fruit is a mango? (2 Marks)
   ii) The two fruits are the same? (2 Marks)

QUESTION TWO (20 MARKS)

a) Differentiate between sample and population. (2 Marks)

b) Using the substitution method, find the value of a and b given that;
$$2a + 4b = 2$$
$$b - 3a = 11$$
(3 Marks)

c) The following data show prices of ice cream at different times of the year: 45, 30, 48, 40, 55, 37, 42, 58, 35, 46, 44. Calculate;
   i)   Mean (2 Marks)
   ii) 6th decile (4 Marks)
   iii) 40th percentile (4 Marks)

d) A trader bought 2 cows and 9 goats for a total of Ksh 98200. If she had bought 3 cows and 4 goats, she would have spent Ksh 2200 less.
   i)   Form two equations to represent the above information. (2 Marks)
   ii) Use the matrix method to solve the equations to determine the cost of a cow and that of a goat. (3 Marks)

QUESTION THREE (20 MARKS)

a)   Given the matrix $A=\begin{pmatrix} -2 & 1 \\ 5 & 6 \end{pmatrix}$ and $B=\begin{pmatrix} 7 & 8 \\ -3 & 1 \end{pmatrix}$, determine;

    i)   A+B   (2 Marks)

    ii)   AB   (3 Marks)

b)   The CAT marks for nine students are given as follows: 20, 15, 22, 18, 23,17,14. Calculate;

    i)   Geometric mean   (3 Marks)

    ii)   Harmonic mean   (3 Marks)

    iii)   Quartile deviation   (4 Marks)

c)   Draw a bar chart to represent the data given below;

Brand	Nike	Jordan	Airforce	Bata	Adidas	Reebok
Sales	35	25	17	25	13	20

(5 Marks)

QUESTION FOUR (20 MARKS)

a)   Explain the two sources of data, and give an example for each.   (4 Marks)

b)   The following frequency distribution table represents the overall marks obtained in a final examination;

Marks	10-19	20-29	30-39	40-49	50-59
Frequency	5	9	12	10	3

    Calculate;

    i) Mean   (3 Marks)

    ii) Median   (3 Marks)

    iii) Mode   (3 Marks)

    iv) Standard deviation   (4 Marks)

c)   Solve by completing the square method the equation $x^2+4x-5=0$ (3 Marks)

QUESTION FIVE (20 MARKS)

a)   Two marbles are drawn in turns from a pack containing 3 red,6 white, 9 green and 7 black marbles. If this is done with replacement, determine the probability of drawing;

    i)   two white marbles   (2 Marks)

    ii)   a black then a green marble   (3 Marks)

    iii)   no red marble   (2 Marks)

b)   If the drawing of marbles is done without replacement, find the probability of drawing;

    i)   Two red marbles   (2 Marks)

    ii)   A green then a white marble   (3 Marks)

c)   Solve using inverse matrix method;

$$5x-3y=7$$

$$2x-y=5$$

(4 Marks)

d)   Given the determinant of the matrix $M=\begin{pmatrix} x+1 & 1 \\ x & 4 \end{pmatrix}$ is 13, determine the value of x.   (4 Marks)