KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR
FOR THE CERTIFICATE IN INFORMATION TECHNOLOGY
CIT 1003 – COMPUTATIONAL MATHEMATICS

Date: 14TH APRIL 2023
Time: 8:30AM – 10:30AM

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

a)   Solve the equation $(4x - 3)2 + 10x = -60$ (2 Marks)
b)   The ages of 6 student in a class are 15,21,19,23,20,14.Determine the median age (2 Marks)
c)   Differentiate between row matrix and column matrix. (2 Marks)
d)   Solve the following equation $2x^2 - 5x - 7 = 0$ (4 Marks)
e)   Use substitution method to solve the simultaneous equations (5 Marks)

$$4x + 3y = 7$$
$$3x - 2y = 9$$

f)   The following relates to the number of successful sales made by the salesmen employed by a large microcomputer firm in a particular quarter.

No of sales	50-60	60-70	70-80	80-90	90-100	100-110	110-120
No of sales men	7	5	19	12	18	8	18

Required

Calculate the standard deviation sales (4 Marks)

g)   Convert 84_{10} to binary (3 Marks)
h)   Convert 101101_2 to decimal (3 Marks)
i)   Given the matrices A=$\begin{bmatrix} 4 & 8 \\ 3 & -2 \end{bmatrix}$, B=$\begin{bmatrix} 2 & 7 \\ -1 & 2 \end{bmatrix}$

Determine
   i. $B^T A$ (3 Marks)
   ii. $A + B$ (2 Marks)

QUESTION TWO (20 MARKS)
a)   The following data shows the Marks obtained by information technology student in KWUST.

Marks	30-40	40-50	50-60	60-70	70-80
Frequency	25	30	35	28	12

Calculate the;

   i)   Mean (3 Marks)
   ii)   Median (4 Marks)
   iii)   Mode (2 Marks)

b)   Compute for
                i)   Standard variation   (5 Marks)
                ii)   Co-efficient of variation   (3 Marks)
c)   List three advantages of median.   (3 Marks)

QUESTION THREE (20 MARKS)

a)   Solve by Substitution method   (5 Marks)
$$3x + 4y = 17$$
$$2x + 5y = 16$$

b)   Solve by Matrix method   (5 Marks)
$$2x + 5y = 12$$
$$4x + 3y = 10$$

c)   Calculate the median from the following data   (5 Marks)

Class interval	0-20	20-40	40-60	60-80	80-100
frequency	2	5	11	7	4

d)   Solve by Elimination method
$$5x + 3y = 11$$
$$2x + 4y = 10$$ (5 Marks)

QUESTION FOUR (20 MARKS)

a)   Convert each of t following number system to their respective equivalents
                i) 4725_{10} to hexadecimal   (2 Marks)
                ii) 647_{10} to binary   (2 Marks)
                iii) 846_{10} to Octal   (2 Marks)
                iv) 111011_2 to decimal   (2 Marks)

b)   Given two matrices A and B
$$A=\begin{bmatrix} 3 & 4 \\ 2 & 1 \end{bmatrix} \quad B=\begin{bmatrix} 5 & 8 \\ 1 & 2 \end{bmatrix}$$
       Determine the following;
                i.   Transpose of A   (1 Marks)
                ii.   AB   (4 Marks)
                iii. B^T+A (3 Marks)
                iv. $(BA)^{-1}$ (4 Marks)

QUESTION FIVE (20 MARKS)

a)   Discuss five characteristic of a good average.   (5 Marks)
b)   The table below shows the masses of 200 people.

Mass (kg)	40-49	50-59	60-69	70-79	80-89	90-99
No. of people	9	27	32	18	24	10

       Draw a cumulative frequency curve for the above data.   (5 Marks)

       Use the graph to estimate

                i.   The median mass   (2 Marks)
                ii.   The number of people whose mass lies between 60.5 kg and 70.5 kg. (2 Marks)

c)   The table below shows Marks of student in ICT class.

MARKS	NO.OF STUDENT
0-10	2
10-20	7
20-30	11
30-40	6
40-50	4

Calculate the following;
   i) D_5 (3 Marks)
   ii) P_{30} (3 Marks)