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

Date: 10TH AUGUST 2023
Time: 2:30PM – 4:30PM

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

QUESTION ONE (30 MARKS)

a) Solve the following quadratic equation ; $5x^2 - x - 6 = 0$ (3 Marks)

b) Differentiate the following function, $y = -2x^6 - 5x^{-3} + 6$ (3 Marks)

c) Two matrices are given below

$$A=\begin{bmatrix}7 & 4\\ 2 & -5\end{bmatrix} \quad B=\begin{bmatrix}6 & 0\\ -3 & 1\end{bmatrix}$$

i) A+B (2 Marks)

ii) B-A (2 Marks)

d) Convert the following number system

i) 11101_2 *to decimal* (3 Marks)

ii) 7615_{10} *to octal* (3 Marks)

e) A bag contains 3 red and 4 black balls. A man picks 2 at random, find the probability of picking 2 red balls. (3 Marks)

f) Compute the mean from the following data, 24,20,62,15,55,18,63,46 (3 Marks)

g) State 5 characteristics of a good average (5 Marks)

QUESTION TWO (20 MARKS)

a) The distribution of weights measured o the nearest kilogram(kg) of 42 girls was shown below.

Weight (Kg)	10-20	20-30	30-40	40-50	50-60
Frequency	1	5	11	15	10

Compute:

i) Mean (3 Marks)

ii) Median (4 Marks)

iii) D_6 (4 Marks)

iv) Mode (2 Marks)

v) Standard variation (5 Marks)

vi) Coefficient of variation (2 Marks)

QUESTION THREE (20 MARKS)

a) Given two matrices A and B

$$A=\begin{bmatrix}3 & 4\\ 1 & 5\\ 8 & 2\end{bmatrix} \quad B=\begin{bmatrix}-2 & 3 & 6\\ 3 & 7 & -6\end{bmatrix}$$

Determine the following;

i) Transpose of A (1 Mark)
ii) BA (3 Marks)
iii) B^T+A (3 Marks)
iv) $(BA)^{-1}$ (3 Marks)

b) From the following distribution, calculate
i) Standard deviation (5 Marks)
ii) P_{60}

Class interval	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	20	25	36	72	51	40

QUESTION FOUR (20 MARKS)

a) Convert each of the following number system to their respective equivalents
i) 725_8 to decimal (2 Marks)
ii) 2562_{10} to octal (3 Marks)
iii) 8562_{10} to binary (3 Marks)
iv) 101101_2 to decimal (3 Marks)
v) $25D8_{16}$ to decimal (2 Marks)

b) Solve by Substitution method (4 Marks)

3x+2y=13

5x-3y=9

c) Solve by Matrix method (4 Marks)

4x+ y = 9

2x-3y = 2

QUESTION FIVE (20 MARKS)

a) Outline five characteristic of a good measure of dispersion. (4 Marks)

b) Solve by Elimination method

4x+3y=10

3x-2y=2 (4 Marks)

c) Find out the derivatives of the following functions,
i) $y = (x^5 + 3x)(2x)$ (4 Marks)
ii) $y = -2x^4 + 7x^5 + 4x^2 - 3$ (2 Marks)

d) Integrate the following functions with respect to x
i. $\int 8x^3(2x^2 + 8x^3 - 10)$ (3 Marks)
ii. $\int 3x^2 + 8x^4 - 6$ (2 Marks)