



Kasarani Campus
Off Thika Road
Tel. 2042692 / 3
P.O. Box 49274, 00100
NAIROBI
Westlands Campus
Pamstech House
Woodvale Grove
Tel. 4442212
Fax: 4444175

KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2021/2022 ACADEMIC YEAR
CERTIFICATE IN INFORMATION TECHNOLOGY
CIT 1003: COMPUTATIONAL MATHEMATICS

DATE: 28TH JULY 2022
TIME: 11:30AM – 1:30PM

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- a) Solve the following quadratic equation ; $4x^2 - 10x + 6 = 0$ (3 Marks)
- b) State THREE advantages of median as a measure of central tendency (3 Marks)
- c) Differentiate the following function, $y = -2x^6 - 5x^{-3} + 6$ (3 Marks)
- d) Given the following two matrices

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

Compute:

- i) $A+B$ (2 Marks)
- ii) $B-A$ (2 Marks)
- e) Convert the following number system
- i) 784_2 to decimal (3 Marks)
- ii) 865_{10} to octal (3 Marks)
- f) 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)
- g) Compute the median from the following data, 51,65,40,44,46,55,48,62, 70. (3 Marks)
- h) Solve the following simultaneous equation;

$$3x - 4y = 1$$

$$2x + 3y = 4$$

(5 Marks)

QUESTION TWO (20 MARKS)

- a) The distribution of weights measured o the nearest kilogram(kg) of 50 girls is as shown below.

Weight (Kg)	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	1	5	11	15	10	5	2

Compute

- i) Mean (3 Marks)
- ii) Median (4 Marks)
- iii) Mode (3 Marks)
- iv) Quartile deviation (5 Marks)
- v) Standard variation (5 Marks)

QUESTION THREE (20 MARKS)

a) Given the following 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 Marks)
 ii) BA (3 Marks)
 iii) $B^T + A$ (3 Marks)
 iv) $(BA)^{-1}$ (3 Marks)

From the following distribution, calculate

- i) Geometric mean (5 Marks)
 ii) Harmonic mean (5 Marks)

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) 562_{10} to octal (3 Marks)
 iii) 852_{10} to binary (3 Marks)
 iv) 101101_2 to decimal (3 Marks)
 v) 258_{16} to decimal (2 Marks)

b) Solve by Substitution method; (4 Marks)

$$\begin{aligned} 3x + 2y &= 3 \\ 5x + 3y &= 15 \end{aligned}$$

c) Solve by Matrix method; (4 Marks)

$$\begin{aligned} 4x + y &= 6 \\ 2x - y &= -3 \end{aligned}$$

QUESTION FIVE (20 MARKS)

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

b) Solve by Elimination method;

$$\begin{aligned} 4x + 3y &= 7 \\ 3x - 2y &= 9 \end{aligned} \quad (5 \text{ Marks})$$

c) Find out the derivatives of the following functions,

- i) $y = 5x^5 + 3x^3 + 4x^{-2} + 6$ (3 Marks)
 ii) $y = -2x^4 + 7x^5 + 4x^2 - 3$ (3 Marks)

d) Integrate the following functions with respect to x

- i) $y = 8x^3 - 3x^2 + 8x^{-2} - 10$ (2 Marks)
 ii) $y = 3x^4 + 3x^{-4} + 2$ (2 Marks)