2025

COMPUTER APPLICATION

Paper: CIT0100304-N

(MATHEMATICS-I)

Full Marks – 60

Time: $2^1/_2$ hours

The figures in the margin indicate full marks for the questions

1. Answer the following questions: 1 x 8 = 8
   (a) What is Power Set?
   (b) Define Rank of a matrix
   (c) What is Skew-Symmetric Matrix?
   (d) What is Co-factor?
   (e) Form a 2 x 2 matrix whose elements are $(2i - 3j)^2$
   (f) What is *Primary Data?*
   (g) Give an example of a square matrix A for which $A^2 = A$.
   (h) What is *Probability?*

2. Answer the following: ***(any six)*** 2 x 6 = 12
   (a) Find the all the cofactors of $\begin{bmatrix} 2 & -3 \\ -7 & -1 \end{bmatrix}$
   (b) Calculate the probability of getting at least 2 HEAD while tossing 2 coins together.
   (c) Explain Conditional Probability.
   (d) What is *a Convex Function*?
   (e) Define Sample Space.
   (f) Convert the relation R = {(x, y): x-y is divisible by 3} defined over the set A= {1,2,3,4,5} to am Matrix.
   (g) Define Trace of a Matrix. Also give one example.
   (h) The Mean of 20 values are calculated as 17. Later it is found that 2 values are recorded wrongly as 50 and 13 instead of 15 and 30 respectively. Calculate the Actual Mean.
   (i) Explain the concept of Venn Diagram.
   (j) Explain in brief the procedure of calculating Median of a grouped Frequency distribution using a graphical method.

3. Answer ***any four*** from the following questions: 5 x 4 = 20

(a) Calculate Standard Deviation for the following example.

X_i:	8	11	13	15	18
F_i:	3	5	7	4	1

(b) Prove that $2^{2n} - 1$ is divisible by 3 for all n.

(c) Find the eigen values of the matrix $\begin{bmatrix} -6 & 3 \\ 4 & 5 \end{bmatrix}$

(d) Explain the different Set Operations.

(e) Define Equivalence Relation. Give Examples and prove.

(f) Solve the equations given in 3(g) using Crammers Rule.

(g) Solve the following using Gaussian elimination method.

$$x - y + 2z = 3$$
$$x + 2y + 3z = 5$$
$$3x - 4y - 5z = -13$$

4. Answer ***any two*** of the following questions: 10 x 2 = 20

(a) The following table shows the marks scored by students of a class in an examination of 70 marks. Find the average mark obtained by a student and mode. Also draw Frequency Polygon.

Marks Scored	10 - 20	20 - 30	30 - 40	40 - 50	50-60	60-70
No. of Students	2	4	10	25	14	5

4+3+3

(b) Using the table as given in Question 4(a), draw ***Ogive*** and ***Histogram***. Also calculate the Median Graphically.

5+3+2

(c) Define the terms: **Poset, Multi Set, Vectors, Eigen Vector.**

(d) Find the inverse of the matrix $\begin{bmatrix} 4 & 3 & 8 \\ 6 & 2 & 5 \\ 1 & 5 & 9 \end{bmatrix}$