

2025

COMPUTER APPLICATION

Course Name : Mathematics- I

Course Code : BCA-DSC-1024

Full Marks : 60

Time : $2\frac{1}{2}$ Hours*The figures in the margin indicate full marks for the questions.*

1. Answer the following questions : 1x8=8
 - a) What is an Identity Matrix ?
 - b) Define Lower Triangular matrix
 - c) What is Skew-Symmetric Matrix ?
 - d) What is minor in a matrix ?
 - e) Form a 2×2 matrix whose elements are $(i+j)^2$
 - f) What is a Singleton Set ?
 - g) Define *Reflexive Relation*.
 - h) What is *Cardinality of a set* ?
2. Answer *any six* from the following : 2x6=12
 - a) Find the adjoint of $\begin{bmatrix} -3 & 1 \\ 4 & 5 \end{bmatrix}$
 - b) Explain Cartesian Product of two sets.
 - c) Explain the concept of *Inverse of a Matrix*.
 - d) What is *Domain* and *Range* of a function.
 - e) Define Equivalence Relation.
 - f) Define Bijective Function.
 - g) Find the *Power Set* of $A = \{1, 3, 5\}$
 - h) Give an example of any square matrix A for which $A^2 = A$

(Turn over)

3. Answer *any four* from the following questions : 5x4=20

- Show that any square matrix can be represented as sum of symmetric matrix and a skew-symmetric matrix.
- Explain the concept of Co-factors in a 3×3 matrix with an example.
- Prove that $2^n > n^2$ for all $n \geq 5$
- Explain Cramer's Rule along with an example.
- Explain *Cartesian Product* and *Symmetric Difference* of 2 set.

$$x - y + 2z = 3$$

$$x + 2y + 3z = 5$$

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

4. Answer *any two* of the following questions : 10x2=20

- The size of house of 120 families in a village is given below. Find the average size and median size of house. Also draw Frequency Polygon. 4+4+2

Size of house (in m^2)	100-130	130-160	160-190	190-220	220-250
No of families	20	35	45	11	9

- Draw the *less than ogive* and *more than Ogive* for the table given in question 5(a).
- Find the inverse of the Matrix $\begin{bmatrix} 4 & 3 & 8 \\ 6 & 2 & 5 \\ 1 & 5 & 9 \end{bmatrix}$
- Define the terms : Median, Sample Space, Frequency, Probability, Variance.
