INDIRA UNIVERSITY, PUNE

SCHOOL OF INFORMATION TECHNOLOGY- BCA

Term End Examination (2025 Pattern) April- May – 2026- Semester – II

Course Name: Matrix Algebra **Max. Marks: 25**
Course Code: 25BCA209T **Time: 1 Hr. 30 Minutes**

Instructions :

- All Questions are compulsory.
- Non-programmable calculator is allowed.

Q1	**Attempt any 5 out of 7. (1 Mark each) [5 Marks]** a) Define Upper Triangular Matrix. b) Let $A = \begin{bmatrix} 2 & -4 \\ 0 & 3 \end{bmatrix}$. Find minor of M_{12} and cofactor of C_{12}. c) Find the determinant of matrix $A = \begin{bmatrix} 4 & 3 \\ -1 & -3 \end{bmatrix}$. d) If A^{-1} exists, what is $(A^{-1})^{-1}$? e) Convert the matrix $\begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$ into reduced row echelon form. f) Define transpose of a matrix. **g)** Let $3x - 4y = 2$ and $2x + y = 5$. Determine whether the system is Consistent or Inconsistent?	CO1
Q2	**Attempt any 2 out of 4. (5 marks each) [10 Marks]** a) Find the rank of the matrix $A = \begin{bmatrix} 0 & 1 & 2 & 1 \\ 1 & -1 & 0 & 2 \\ 1 & 2 & 1 & 1 \end{bmatrix}$. b) Find A^{-1} if $A = \begin{bmatrix} -2 & -7 & -9 \\ 2 & 5 & 6 \\ 1 & 3 & 4 \end{bmatrix}$. c) If $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 3 & 1 \end{bmatrix}$. Verify that $(AB)^{-1} = B^{-1}A^{-1}$. **d)** If $A = \begin{bmatrix} 3 & -2 \\ 5 & 4 \end{bmatrix}, B = \begin{bmatrix} 1 & 4 \\ 6 & -7 \end{bmatrix}$. Find $A - 4B + 7I_2$ where I_2 is identity matrix in order 2.	CO2

Q3	Solve the following system by using the Gauss Elimination Method. **[10 Marks]** $x + y + z = 6$ $2x + 3y + z = 14$ $3x + 2y + 2z = 13$ **OR**	CO3
	a) Solve the following system by using the LU Decomposition Method. $3x + y = 5$ $6x + 5y = 16$ **[5 Marks]** b) Solve the following system by using the Cramer's Rule. **[5 Marks]** $3x + 2y = -1$ $4x - 3y = 10$	