



SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST - I
WINTER SEMESTER 2024-2025

SLOT: A1+TA1+TAA1

Programme Name & Branch : B Tech
Course Code and Course Name : MAT2004-Linear Algebra
Faculty Name(s) : Common
Class Number(s) : VL2024250504902, VL2024250504905
Date of Examination : 27.01.2025
Exam Duration : 90 minutes

Maximum Marks: 50

General instruction(s): Answer All Questions

Q. No	Question	M	CO	BL
1.	(i) Without expanding, find the value of $\begin{vmatrix} a & b & c & d \\ a & a+b & a+b+c & a+b+c+d \\ a & 2a+b & 3a+2b+c & 4a+3b+2c+d \\ a & 3a+b & 6a+3b+c & 10a+6b+3c+d \end{vmatrix} \quad (5M)$ (ii) Determine the values of b such that the rank of the matrix A is 3, where $A = \begin{bmatrix} 1 & 1 & -1 & 0 \\ 4 & 4 & -3 & 1 \\ b & 2 & 2 & 2 \\ 9 & 9 & b & 3 \end{bmatrix} \quad (5M)$	10	1	1
2.	Solve the system of equations $x + y + z = 11$, $2x - 6y - z = 0$, $3x + 4y + 2z = 0$ using Cramer's rule.	10	2	1
3.	Determine the values of a and b for which the system of equations $x + 2y + 3z = 6$, $x + 3y + 5z = 9$, $2x + 5y + az = b$ has (i) No solution (ii) Unique solution (iii) Infinite number of solutions. Also find the solution in case-(ii).	10	2	2
4.	Using Gauss-Jordan method, find the inverse of the matrix $M = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$.	10	2	1
5.	Solve the system $3x_1 - 6x_2 - 3x_3 = -3$, $2x_1 + 6x_3 = -22$, $-4x_1 + 7x_2 + 4x_3 = 3$ using LU Decomposition method.	10	2	1