



VIT[®]

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF ADVANCED SCIENCES

Winter Semester 2023-2024

Continuous Assessment Test –I

Programme Name & Branch: B.Tech.

Slot: C2+TC2+TCC2

Course Name & code: Linear Algebra (MAT2004)

Class Number (s): VL2023240503811, VL2023240503814

Exam Duration: 90 Min.

Maximum Marks: 50

General instruction(s): Answer ALL Questions

Q.No.	Question	Max. Marks
1.	Prove that $\begin{vmatrix} 1+a & b & c & d \\ a & 1+b & c & d \\ a & b & 1+c & d \\ a & b & c & 1+d \end{vmatrix} = 1+a+b+c+d.$	10
2.	Find the rank of the matrix $A = \begin{bmatrix} 2 & -2 & 0 & 6 \\ 4 & 2 & 0 & 2 \\ 1 & -1 & 0 & 3 \\ 1 & -2 & 1 & 2 \end{bmatrix}$.	10
3.	In a given electrical network, the equation for the currents i_1, i_2, i_3 are $3i_1 + i_2 + i_3 = 8$; $2i_1 - 3i_2 - 2i_3 = -5$; $7i_1 + 2i_2 - 5i_3 = 0$. Calculate i_1, i_2 and i_3 by Cramer's rule.	10
4.	Find the values of λ for which the equations $(\lambda-1)x + (3\lambda+1)y + 2\lambda z = 0$, $(\lambda-1)x + (4\lambda-2)y + (\lambda+3)z = 0$, $2x + (3\lambda+1)y + 3(\lambda-1)z = 0$ are consistent and analyze the ratios of x, y, z for these values of λ .	10
5.	Find the inverse matrix $A = \begin{pmatrix} 1 & 0 & 2 \\ 2 & -1 & 3 \\ 4 & 1 & 8 \end{pmatrix}$ by Gauss-Jordan Elimination method.	10