



VIT

Vellore Institute of Technology

SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2025-2026

REG.NO. [REDACTED]

SLOT: A1+TA1+TAA1

Programme Name & Branch : Int. M.Tech.
Course Code and Course Name : IMAT201L & Complex Variables and Linear Algebra
Faculty Name(s) : Dr. Ramesh Kumar D, Dr. Srinivasa Murthy T,
Dr. Kalaivani K, Dr. Chandru M
Class Number(s) : VL2025260100923, 0925, 0927, 0929
Date of Examination : 05.10.2025
Exam Duration : 90 minutes
Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply)
- CO3: Evaluate real integrals using techniques of contour integration.
- CO4: Use the power of inner product and norm for analysis.
- CO5: Use matrices and transformations for solving engineering problems.

Q. No	Question	M	CO	BL
1.	(i) Find the residue of $f(z) = \frac{z^2-2z}{(z+1)^2(z^2+4)}$ at each of its singularities.	5		
	(ii) Evaluate $\int_C \frac{z+1}{(z^2+2z+4)^2} dz$ where C is $ z+1+i =2$ using Cauchy's Integral formula.	5	3	2
2.	Evaluate $\int_0^{2\pi} \frac{\sin^2 \theta}{a+b \cos \theta} d\theta$, where $a > b > 0$.	10	3	2
3.	(i) For what value of k , the vector $(1, k, 5) \in V_2(\mathbb{R})$ is the linear combination of the vectors $(1, -3, 2)$ and $(2, -1, 1)$?	5		
	(ii) Is the vector $(2, -5, 3) \in \mathbb{R}^3$ member of the subspace of $\mathbb{R}^3$ spanned by $(1, -3, 2)$, $(2, -4, -1)$ and $(1, -5, 7)$?	5	4	3
4.	Solve the following system of linear equations by Gauss-Jordan method: $2x - 2y + 3z = 2$ $x + 2y - z = 3$ $3x - y + 2z = 1$	10	5	2
5.	Find the eigenvalues and eigenvectors of the matrix $\begin{pmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{pmatrix}$ Also, find A^{-1} using Cayley-Hamilton theorem. In addition, state the eigenvalues of A^{-1} and A^4 .	10	5	2