



VIT

Vellore Institute of Technology

Vellore - 632014, Tamil Nadu, India
DEPARTMENT OF MATHEMATICS
SCHOOL OF ADVANCED SCIENCES
FALL SEMESTER 2025-2026

REG.NO.:

SLOT: A2TA2+TAA2

Programme Name & Branch : B. Tech
Course Code and Course Name : BMAT201L & Complex Variables and Linear Algebra
Faculty Name(s) : Common question paper for this slot
Class Number(s) : Common question paper for this slot
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, 4 - Analyse, 5 - Evaluate, 6 - Create) -
- CO3-Evaluate real integrals using techniques of contour integration. CO5- Use matrices and transformations for solving eigenvalue problems.

Q. No	Question	Marks	Course Outcome (CO)	Bloom's Taxonomy (BL)
1.	(i) Identify and classify all the singular points of $f(z) = \frac{1}{z^6+128}$ (ii) Evaluate $\oint \operatorname{cosec} z \, dz$ where the contour C is the circle $ z = 2$.	10	CO3	BL2
2.	Apply residue theorem to evaluate the integral $\int_0^{2\pi} \frac{d\theta}{10+6 \cos\theta}$.	10	CO3	BL3
3.	For a matrix $A = \begin{bmatrix} 3 & 1 & 1 \\ 1 & 5 & 1 \\ 1 & 1 & 3 \end{bmatrix}$ (i) Find the Eigenvalues and Eigenvectors of A (ii) Using Cayley-Hamilton theorem, find the inverse of A. (iii) Find the eigenvalues of A^{-1} .	10	CO5	BL3
4.	Apply Gauss-Elimination method to solve the following system of equations: $x_1 - x_2 + 3x_3 - 2x_4 = 1$ $-2x_1 + 4x_2 - 3x_3 + x_4 = 1.5$ $3x_1 - x_2 + 10x_3 - 4x_4 = 2$ $4x_1 - 3x_2 + 8x_3 - 2x_4 = 2.5$.	10	CO5	BL3
5.	(a) Verify whether $W = \{(x, y, z, w) \in \mathbb{R}^4 \mid x = 2y, z = 3w - y\}$ is a Subspace of $\mathbb{R}^4(\mathbb{R})$ or not. (b) Determine whether the following set $S = \{(1, 3, 1), (1, 1, 0), (0, 2, 1)\}$ form a basis for $\mathbb{R}^3(\mathbb{R})$ or not.	10	CO5	BL3
