



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

SLOT: A2+TA2+TAA2

Programme Name & Branch : M.Tech. (Integrated) Software Engineering
Course Code and Course Name : IMAT201L, Complex Variables and Linear Algebra
Faculty Name(s) : Prof. Ramesh Kumar D, Prof. Srinivasa Murthy T,
Prof. Kalaivani K and Prof. Chandru M
Class Number(s) : VL2025260100924, 926, 928 and 930
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.
- BL: 1 - Remember, 2 - Understand, 3 - Apply.
- CO: 3, Evaluate real integrals using techniques of contour integration.
4. Use the power of inner product and norm for analysis.
5. Use matrices and transformations for solving engineering problems.

Q. No	Question	M	CO	BL
1.	Evaluate the integral $I = \oint_C \frac{\tan(\frac{z}{2})}{(z-a)^2} dz$, $-2 < a < 2$ where C is a boundary of the square where sides lie along $x = \pm 2$ and $y = \pm 2$ described in the positive sense using Cauchy integral formula.	10	CO3	3
2.	Show that $\int_{-\infty}^{\infty} \frac{\sin 2x}{x(x^2+3^2)} dx = \frac{\pi}{2} \left[\frac{2-e^{-6}}{9} \right]$.	10	CO3	2
3	Find the basis and dimension of the following subspaces $U = \{(a, b, c, d, e) 2a - b - c = 0, d - 3e = 0\}$ and $W = \{(a, b, c, d, e) c + d = 0\}$. Also, determine the dimension of $U \cap W$.	10	CO4	1
4.	(a) If 2, -1, -3 are the Eigenvalues of the matrix A then find the Eigenvalues of the matrix $A^2 - 2I$. (b) Using Cayley-Hamilton theorem, find the value of $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$ when $A = \begin{bmatrix} 0 & 2 & 0 \\ 0 & 1 & 0 \\ 1 & 0 & 2 \end{bmatrix}$.	3+7	CO5	3
5.	Find the value of a and b for which the equations $x + y + z = 3$, $x + 2y + 2z = 6$, $x + ay + 3z = b$, have (i) no solution, (ii) a unique solution and (iii) infinitely many solutions.	10	CO5	2
