VIT

Vellore Institute of Technology

REG.NO.

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

SLOT: A1+TA1+TAA1

Programme Name & Branch	: M.Tech. (Integrated) Software Engineering
Course Code and Course Name	: IMAT201L, Complex Variables and Linear Algebra
Faculty Name(s)	: Dr. Chandru M, Dr. Kalaivani K, Dr. Ramesh Kumar D, Dr. Srinivasa Murthy T
Class Number(s)	: VL2025260100923,0925, 0927,0929
Date of Examination	: 17/08/2025
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: 1. Construct analytic functions and find complex potential of fluid flow and electric fields.
  2. Find the image of straight lines by elementary transformations and to express analytic functions in power series.

Q. No	Question	M	CO	BL
1.	a) Define an analytic function at a point $z = a, a \in \mathbb{C}$ and find the values of c_1 and c_2 such that $f(z) = x^2 + c_1y^2 - 2xy + i(c_2x^2 - y^2 + 2xy)$ is analytic.	7	1	1
	b) Determine the function $f(z) = \frac{z}{z^2-1}$ where it fails to be analytic.	3		
2.	Prove that the function $u(x, y) = (x - y)(x^2 + 4xy + y^2)$ is harmonic. In an electrostatic field, if u represents the potential function, find the stream function.	10	1	2
3.	a) Find the invariant points of $f(z) = \frac{-2z-4i}{iz+1}$.	5	2	3
	b) Find the image of $\|z\| = 2$ under the transformation $f(z) = z + 2 + 3i$.	5		
4.	Find the bilinear transformation which maps the points $z = 1, i, -1$ into the points $w = i, 0, -i$. Find the image of $\|z\| < 1$ under the determined transformation.	10	2	2
5.	Expand $f(z) = \frac{z}{(z+1)(z-2)}$ in a Laurent's series about $(i) z = -1, (ii)\ z = 2$.	10	2	2

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