REG.NO.:

VIT

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

SLOT: C1+TC1+TCC1

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

Programme Name & Branch : B.Tech., & SCOPE, SCORE, SENSE, SCE, SELECT, SMEC
Course Code and Course Name : BMAT201L & Complex Variables and Linear Algebra
Faculty Name(s) : Common to all C1 slot
Class Number(s) : VL2025260100729, 0773, 0776, 2379, 0731,2507, 0745, 0713, 0677, 0664, 2388, 0680, 0724,0753,0665,0673,0672,0722,0669,0774, 0683, 2381,2386,0671,0718
Date of Examination : 19-08-2025
Exam Duration : 90 minutes
Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes
  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.
  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.	Find the analytic function $f(z)=u+iv$ if $3u-2v=7x^2-7y^2+8xy$. Also, find the functions u and v.	10	1	2
2.	If $\phi=(x-y)(x^2+4xy+y^2)$ can represent the equipotential for an electric field, then find the corresponding complex potential $w=\varphi+i\psi$ and also find ψ.	10	1	3
3.	Find the bilinear transformation that maps the points maps $z_1=-2i, z_2=i, z_3=\infty$ in the z-plane onto the points $w_1=0, w_2=-3, w_3=\frac{1}{3}$ in the w-plane respectively, then, determine the invariant points of the transformation	10	2	3
4.	Find the image of the triangle with vertices i,$1+i$,$1-i$ in the z-plane under the transformation $w=3z+4-2i$.	10	2	3
5.	Find the Laurent's series for the function $f(z)=\frac{1}{(z+1)(z+2)^2}$ in the interior circle with centre at 1 and radius less than 2, also the annular region $2<\lvert z-1\rvert<3$.	10	2	1