



VIT

Vellore Institute of Technology
(Approved by the University Grants Commission, Act, 1956)

REG.NO.:

SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2024-2025

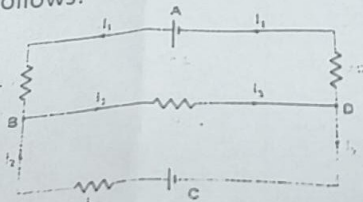
SLOT: C2+TC2+TCC2

Programme Name & Branch : B. Tech.
 Course Code and Course Name : BMAT201L-Complex Variables and Linear Algebra
 Faculty Name(s) : Common paper
 Class Number(s) :
 Date of Examination :
 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:
 3. Evaluate real integral using Contour integration
 5. Use the matrices and transforms for solving the engineering problems

Q. No	Question	M	CO	BL
1.	(a) Discuss on the singularities of the function $f(z) = \frac{z^2-1}{z^2(z+1)(z+2)}$	10	3	2
2.	(b) Evaluate $\oint_C \frac{3z^3}{(z-1)(z^2+9)} dz$, where $C: z-2 =2$			
	Evaluate the real integral $\int_{-\infty}^{\infty} \frac{\cos x}{x^2-10x+9} dx$ using the contour integration	10	3	3
3.	Let $A = \begin{bmatrix} 2 & -1 & 2 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$. Calculate A^{-1} and A^4 using Cayley-Hamilton theorem. Also find the eigenvalues of A^{-1} and A^4 .	10	5	2
4.	An electrical circuit is as follows:	10	5	3



By applying Ohm's and Kirchhoff's law for this electrical circuit, we can obtain the following linear system in I_1, I_2 and I_3 :

$$I_1 + I_2 - I_3 = 0; 4I_1 + I_3 = 8; 4I_2 + I_3 = 16$$

Determine the currents I_1, I_2 and I_3 flows from the given circuit using Gauss Jordan method.

5. (a) Let V be the vector space of polynomials of degree at most 2. Let $v_1 = t^2 + 2t + 1$, and $v_2 = t^2 + 2$. Does the set $\{v_1, v_2\}$ span V ? 10 5 2
- (b) Find a basis for the subspace W of R^3 spanned by $\{(1, 2, 2), (3, 2, 1), (11, 10, 7), (7, 6, 4)\}$. What is the dimension of W ?
