REG.NO. :

VIT

Vellore Institute of Technology

NAME OF THE SCHOOL: SAS

CONTINUOUS ASSESSMENT TEST - II

FALL SEMESTER 2024-2025

SLOT: C1+TC1+ T+TCC1

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	: 15-10-2024
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 (Type the CO statements covered in this question paper. Use the CO number as per the syllabus copy)

Q. No	Question	M	CO	BL
1.	a) Discuss the nature of the singularity of the function $f(z)=\frac{z-\sin z}{z^2}$.	4	3	2
	b) Evaluate $\int_C \frac{2+3\sin \pi z}{z(z-1)^2}\,dz$ where C is the square bounded by the lines $x=\pm 3$ and $y=\pm 3i$ using Cauchy's integral formula.	6	3	3
2.	Evaluate $\int_{-\infty}^{\infty} \frac{\cos x}{4x^2+1}\,dx$ using Residue theorem.	10	3	3
3.	Let $A=\begin{pmatrix} 3 & -2 & -1 \\ 2 & 3 & 4 \\ -2 & 0 & 5 \end{pmatrix}$. Use Cayley-Hamilton theorem to find constants a, b and c such that $A^4 = aA^2 + bA + cI$, where I is an identity matrix of order 3. Also find A^{-1}.	10	5	3
4.	On a particular day, four persons went to market. First person bought one apple, two oranges, one mango and three pineapples for 9 dollars, second person bought two apples, one orange, two mangoes and one pineapple for 10 dollars, third person bought one apple, one orange, one mango and two pineapples for 7 dollars and fourth person bought one apple, three oranges, one mango and one pineapple for 8 dollars. Find the cost of each fruit using Gauss Jordan method.	10	5	3
5.	a) Let $R^4(R)$ be a vector space over a field R and $W=\{(x, y, z, w) \in R^4 \mid x=2y, z=3w-y\}$. Verify whether W is a subspace of $R^4(R)$ or not.	5	5	2
	b) Let $R^3(R)$ be a vector space over a field R and $S=\{(1, 1, 0), (1, 0, 2), (1, 1, 1)\}$ a linearly independent subset of R^3. Verify whether S is a basis of $R^3(R)$ or not.	5	5	2