REG.NO.:

VIT
Vellore Institute of Technology

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

SLOT:A2+TA2+TAA2

Programme Name & Branch	: B.Tech
Course Code and Course Name	: BMAT201L-Complex variables and Linear Algebra
Faculty Name(s)	: Common paper for the slot
Class Number(s)	: Common paper for the slot
Date of Examination	: 13.10.2024
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.	(i)Evaluate $\oint_C \frac{e^z}{z(1-z)^3}dz$ where C is $\lvert Z-1\rvert=\frac{1}{2}$ using Cauchy's integral formula (6M) (ii) Determine the nature of singularities of $f(z)=\frac{1-\cos z}{z}$ and $g(z)=\frac{z^4}{1+z^4}$ (4M)	10	3	3
2.	Evaluate $\int_0^{\pi} \frac{\cos^2 x}{5-4\cos 2x}dx$ using contour integration and residue theorem.	10	3	3
3.	Solve the following system of equations $10x_1-7x_2+3x_3+5x_4=6;$ $-6x_1+8x_2-x_3-4x_4=5;\ 3x_1+x_2+4x_3+11x_4=2;5x_1-9x_2-2x_3+4x_4=7$ using Gauss elimination method.	10	5	2
4.	Verify Cayley-Hamilton theorem for $A=\begin{bmatrix}2&1&1\\0&1&0\\1&1&2\end{bmatrix}$ and hence find its inverse. Also find $B=A^8-5A^7+7A^6-3A^5-5A^3+8A^2-2A+I$	10	5	3
5.	(i) Verify whether $S=\{(1,-2,1),(2,1,-1),(7,-4,1)\}$ is linearly dependent (or) independent? (5M) (ii) Let V be a vector space in $\mathbb{R}^3$. Examine whether the following are the subspaces or not? (a) $W_1=\{(a,b,c)\in\mathbb{R}^3 / a^2+b^2+c^2\le 1\}$; (b) $W_2=\{(a,b,c)\in\mathbb{R}^3 / a=b=c\}$ (5M)	10	5	4

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