



VIT

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

REG.NO.: 23BKT0088

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 $ z-1 = \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) $W_1 = \{(a, b, c) \in \mathbb{R}^3 / a^2 + b^2 + c^2 \leq 1\}$; (b) $W_2 = \{(a, b, c) \in \mathbb{R}^3 / a = b = c\}$ (5M)	10	5	4
