



SCHOOL OF ADVANCED SCIENCES (SAS)
CONTINUOUS ASSESSMENT TEST - I
FALL SEMESTER 2025-2026

SLOT: C2+T

Programme Name & Branch	: B.Tech.	
Course Code and Course Name	: BMAT201L - Complex Variables and Linear Algebra	
Faculty Name(s)	: Common question paper	
Class Number(s)	: Common question paper	
Date of Examination	: 07-10-2025	
Exam Duration	: 90 minutes	Maximum Marks

General instruction(s):

- Answer All Questions. Open note book/text book exam.
- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- Course Outcomes:
 CO3: Evaluate the real integrals using contour integration.
 CO5: Use matrices and transformations for solving engineering problems.

Q. No	Question	M	C
1	Let $f(z) = \frac{\sin 2z}{(z+3)(z+1)^2}$ be a complex function. (i) Identify the singularities for $f(z)$ and discuss their nature. (ii) Evaluate the contour integral $\oint_C f(z)dz$ using Cauchy's integral formula. Where, C be a rectangular contour with vertices $3+i, -2+i, -2, -i, 3-i$ lying in the complex plane.	10	
2	The resonance phenomena of an oscillatory vibrating object is nicely described the improper integral $I = \int_{-\infty}^{\infty} \frac{e^{2ix}}{(x^2+4)(x^2+1)} dx$. Evaluate the integral I using contour integration.	10	3
3	The current (I_k) in the four circuits is denoted by I_1, I_2, I_3, I_4 . Using Kirchhoff's Law, the following system of linear equations governs the entire circuit system. $-2I_1 + 8I_2 - 4I_3 = 18; -4I_2 + 14I_3 - 6I_4 = -27;$ $-I_1 - 6I_3 + 12I_4 = 0; 8I_1 - 2I_2 - I_4 = -23$ Solve for each current using Gauss-Jordan method.	10	5
4	Let $A = \begin{bmatrix} 2 & -1 & 2 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$. Find the characteristic equation for A. Compute the eigenvalues of A. Hence, find A^{-1} using Cayley Hamilton theorem.	10	5
5	(i) Let $W = \{(x, y, z) 4x - 2y + 3z = d\}$ be a subset to a standard vector space $V = R^3$. Is the set W forms a subspace to V? if not, for what values of d, the W will be a subspace to V? (ii) Let $V = R^3$ be a standard vector space. Does the vectors $(2 \ -1 \ 1), (4 \ -7 \ -1), (1 \ 2 \ 2)$ can span V?	10	5
