

Programme Name & Branch
 Course Code and Course Name
 Faculty Name(s)

:B.Tech & Common
 :BMAT201L and Complex variables and Linear Algebra
 : Poornima T, Subramanyam Reddy A, Arun Kumar B,
 Chandru M, Uma K, Rajesh Bhatt
 : VL2024250102483, VL2024250102488, VL2024250102484,
 VL2024250102485, VL2024250102487, VL2024250102486

Exam D...
 General inst... (s):

: 14-10-2024
 : 90 minutes

Maximum Marks: 50

- 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)
 CO - 3,5

Q. No	Question	M	CO	BL
1.	Evaluate the integral $I = \int_C \frac{\tan\left(\frac{z}{2}\right)}{(z-a)^2} dz$, $-2 < a < 2$ where C is the boundary of the square where sides lie along $x = \pm 2$ and $y = \pm 2$ described in the positive sense, using Cauchy integral formula.	10	3	2
2.	By Cauchy residue theorem, Compute the value of the integral $\int_{-\infty}^{\infty} \frac{\sin(x)}{x^2 + x + 1} dx$.	10	3	3
3.	Consider the economy described in Table 1. Suppose that the open sector has a demand for \$7900 worth of manufacturing products, \$3950 worth of agricultural products, and \$1975 worth of utilities. The consumption matrix, production vector, and outside demand vector are $C = \begin{bmatrix} 0.5 & -0.1 & -0.1 \\ -0.2 & 0.5 & -0.3 \\ -0.1 & -0.3 & 0.6 \end{bmatrix}, P = \begin{bmatrix} p_1 \\ p_2 \\ p_3 \end{bmatrix} \text{ and } D = \begin{bmatrix} 7900 \\ 3950 \\ 1975 \end{bmatrix}$ (a) Can the economy meet this demand? (b) If so, find a production vector P that will meet it exactly applying Gauss-Jordan method.	10	5	3
4.	a) If 2, 3 are the eigen values of $A = \begin{bmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ a & 0 & 2 \end{bmatrix}$, find the value of a.	5	5	3
	b) In the given circuit, the two point network has the impedance matrix $Z = \begin{bmatrix} 4 & 6 \\ 6 & 12 \end{bmatrix}$. Simplify the circuit analysis by determine the eigenvalues and eigenvectors.	5		



VIT

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REG.NO.:

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

SLOT:B2+TB2+TBB2

5.	a) Determine whether the set $\{x^3 + 2x^2, -x^2 + 3x + 1, x^3 - x^2 + 2x - 1\}$ in $P_3(\mathbb{R})$, is linearly dependent or linearly independent.	5	5	3
	b) Let P_3 be the vector space over \mathbb{R} of all degree three or less polynomial with real number coefficients. Let $W = \{p(x) \in P_3(\mathbb{R}) / p'(-1) = 0 \text{ \& } p''(-1) = 0\}$ be the subset of $P_3(\mathbb{R})$. Is W , a subspace of $P_3(\mathbb{R})$?	5		
