BHARATIYA VIDYA BHAVAN'S
SARDAR PATEL INSTITUTE OF TECHNOLOGY
MUNSHI NAGAR, ANDHERI (WEST), MUMBAI – 400 058, India
(Autonomous College Affiliated to University of Mumbai)

Mid Semester Examination October 2023

Max. Marks: 30	Duration:1 Hour
Class: SE EXTC (A & B)	Semester: III
Course Code: MA201	Date : 09/10 /23
Subject :- Linear Algebra	Time: 10.00 to 11.00 a.m.

Instructions: (1) All questions are compulsory.
(2) Use of scientific calculator is allowed.

Q. No.	Questions	Max. Marks	CO	BL
Q. 1	Show that the following system of equations is consistent if a, b, c are in arithmetic progression. $3x + 4y + 5z = a$, $4x + 5y + 6z = b$, $5x + 6y + 7z = c$ Find the solution when $a = 1$, $b = 2$, $c = 3$.	7	CO 1	2
Q. 2	Apply Gauss –Seidel Method to solve the following equations $20x + y - 2z = 17$ $3x + 20y - z = -18$ $2x - 3y + 20z = 25$ **Note**: - Perform 5 iterations.	7	CO 2	3
Q. 3	Is the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 0 & 0 & 1 \end{bmatrix}$ diagonalisable? If so find the diagonal matrix and the transforming matrix.	7	CO 5	3
Q. 4	Show that the Eigen values of a unitary matrix are of unit modulus.	2	CO 6	1
Q. 5	Find the characteristic equation of the matrix $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and verify that it is satisfied by A and hence obtain A^{-1} and A^4 **OR**	7	CO6	2

	Find characteristic equation of the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ & find the matrix represented by $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$			

********** **The End** **********