Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India
(Autonomous College Affiliated to University of Mumbai)

END SEMESTER EXAMINATION
SECTION-I

Total Marks: 60 | Duration: 2 Hrs
Class: SE | Semester: III
Name of the Course: Linear Algebra | Branch: ETRX/EXTC

Instructions:
(1) All questions are compulsory
(2) Assume suitable data if necessary
(3) All steps to be shown for full credit
(4) Marks and time are inclusive of section I and II

Q NO.		**Max Marks**	**CO**
Q.1	Find the rank of the following matrix by converting first into row echelon form and then to reduced row echelon form. $A=\begin{bmatrix}2 & -1 & 3 & 4\\ 0 & 3 & 4 & 1\\ 2 & 3 & 7 & 4\\ 2 & 5 & 11 & 6\end{bmatrix}$	**07**	CO1
Q.2	Solve following equations by Gauss Jacobi iteration method, Take 5 iterations, show working for first 2 iterations. Take answer correct up to 4 decimals. $2x - 14y + 3z = 19$ $x - 3y + 16z = 20$ $14x - y + 3z = 18$	**07**	CO2
Q.3	Decode the following message: 26,4,5,8,14,19,3,12,9,25,26,27,14,26,19,9,22,14,13,24,27 under modulo 27, using key matrix A, where $A=\begin{bmatrix}1 & 2 & 1\\ -1 & 0 & 3\\ 0 & 0 & 1\end{bmatrix}$	**08**	CO3

Q.4	Find the characteristic equation of the matrix A where $A=\begin{bmatrix} 1 & 2 & 3 \\ 2 & -1 & 4 \\ 3 & 1 & -1 \end{bmatrix}$ Show that the matrix A satisfies its characteristic equation and hence find (a) A^{-1} (b) A^4 **OR** If $A=\begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ Show that A is diagonalizable. Find diagonal matrix D and transforming matrix M	**08**	CO5

😊 ALL THE BEST 😊