SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

Ramapuram Campus

Department of Mathematics

Assignment - I

Class : I CSE D,F& H **Subject :** Calculus and Linear Algebra

Sub Code : 21MAB101T **Max Marks :** 50

Assignment-I

1. Verify Cayley-Hamilton theorem for the matrix $\begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}$ and hence find A^{-1}.
2. Reduce the Quadratic form $2x_1^2 + 6x_2^2 + 2x_3^2 + x_1x_3$ to canonical form by orthogonal reduction. Find also the nature of the quadratic form.
3. Reduce the Quadratic form $10x_1^2 + 2x_2^2 + 5x_3^2 + 6x_2x_3 - 10x_1x_3 - 4x_1x_2$ to a canonical form by orthogonal reduction. Find also a set of non-zero values of x_1, x_2, x_3 which will make the quadratic form zero.
4. Find the nature, rank, index and signature of the quadratic form $x_1^2 + 2x_2^2 - 3x_3^2$.
5. Diagonalize the matrix $A = \begin{bmatrix} 3 & -1 & 0 \\ -1 & 2 & 1 \\ 0 & -1 & 3 \end{bmatrix}$