SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF MATHEMATICS
18MAB101T - CALCULUS AND LINEAR ALGEBRA
ASSIGNMENT - 1 (UNIT I)

1. Find the eigenvalues and eigenvectors of $\begin{pmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{pmatrix}$

2. Verify Cayley Hamilton theorem and find A^{-1} and A^4 when A=$\begin{bmatrix} 1 & 2 & -2 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$

3. Use Cayley Hamilton theorem to find the value of the matrix given by

   $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$ if the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$

4. Reduce the quadratic form $Q=3x^2+5y^2+3z^2-2xy-2yz+2xz$ to canonical form and hence find its nature, rank, index and signature.

5. Reduce the quadratic form $Q=x_1^2+2x_2x_3$ to canonical form and hence find its nature, rank, index and signature.