SRM Institute of Science and Technology
Department of Mathematics
21MAB101T-CALCULUS & LINEAR ALGEBRA
ACADEMIC YEAR 2022-2023 (ODD)
Tutorial 3 (Unit-I)

1. Write the Quadratic form $Q = x^2 - 2y^2 + 3z^2 - 4xy + 5yz + 6xz$ as product of matrix.

2. Write the Q.F. where $A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 4 & 9 \\ 3 & 9 & 0 \end{pmatrix}$.

3. Determine the nature of the Q.F. $Q = 2x_1x_2 + 2x_2x_3 - 2x_3x_1$ without reducing it to canonical form.

4. Reduce the quadratic form $Q = x_1^2 + 5x_2^2 + x_3^2 + 2x_1x_2 + 2x_2x_3 + 6x_1x_3$ to a canonical form using orthogonal transformation.

5. Reduce the Q.F. $Q = 3x_1^2 + 5x_2^2 + 3x_3^2 - 2x_1x_2 - 2x_2x_3 + 2x_3x_1$ to a diagonal canonical form and hence find its nature, rank, signature and index.