## DEPARTMENT OF MATHEMATICS

## 23MAT101 –MATRICES AND CALCULUS

### UNIT II – ORTHOGONAL TRANSFORMATION OF A REAL SYMMETRIC MATRIX

**PART B QUESTIONS**

1. Diagonalise the matrix A= $\begin{pmatrix} 2 & 0 & 1 \\ 0 & 3 & 0 \\ 1 & 0 & 2 \end{pmatrix}$ by an orthogonal transformation**.**

2. Reduce the quadratic form $10x_1^2 + 2x_2^2 + 5x_3^2 - 4x_1x_2 + 6x_2x_3 - 10x_3x_1$ into canonical form by orthogonal transformation and also find its nature

3. Reduce the quadratic form $8x_1^2 + 7x_2^2 + 3x_3^2 - 12x_1x_2 - 8x_2x_3 + 4x_3x_1$ into canonical form by orthogonal transformation and also find its nature

4. Reduce the quadratic form $2x_1^2 + x_2^2 + 2x_1x_2 - 4x_2x_3 - 2x_3x_1$ into canonical form by orthogonal transformation. Also find the rank, index, signature and nature of quadratic form

5. Reduce the quadratic form $3x^2 - 3y^2 - 5z^2 - 2xy - 6yz - 6xz$ into canonical form by orthogonal transformation. Also find the rank, index, signature and nature of quadratic form**.**