



# SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

Approved by AICTE, New Delhi, Affiliated to Anna University,  
Chennai



Accredited by NAAC-UGC with 'A++' Grade (Cycle III) &  
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COIMBATORE-641 035, TAMIL NADU

## DEPARTMENT OF MATHEMATICS

### 23MAT101 –MATRICES AND CALCULUS

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

##### PART A QUESTIONS

1. Write down the quadratic form corresponding to the matrix  $A = \begin{pmatrix} 0 & 5 & -1 \\ 5 & 1 & 6 \\ -1 & 6 & 2 \end{pmatrix}$

$$x_1^2 + 2x_2^2 + 3x_3^2 + 4x_1x_2 + x_2x_3$$

2. Find the matrix of the quadratic form

3. Determine the nature of the Quadratic form  $f(x_1, x_2, x_3) = x_1^2 + 2x_2^2$

4. Find the Eigen Vector corresponding to the Eigen Value '1' of matrix  $\begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$

5. Find the Eigen Value of  $\begin{pmatrix} 2 & 3 \\ 0 & 3 \end{pmatrix}$  corresponding to the Eigen Vector  $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$

6. Can  $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$  be diagonalized? why?

7. Check whether the matrix A is orthogonal ? Justify  $A = \begin{pmatrix} \cos \theta & \sin \theta & 0 \\ -\sin \theta & \cos \theta & 0 \\ 0 & 0 & 1 \end{pmatrix}$