



# 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 I – MATRIX EIGEN VALUE PROBLEMS

##### PART B QUESTIONS

1. Determine the Eigen values and Eigen vectors of  $\begin{pmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{pmatrix}$
2. Determine the Eigen values and Eigen vectors of  $\begin{pmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{pmatrix}$
3. Find the Eigen values and Eigen vectors of  $\begin{pmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{pmatrix}$
4. Find the Eigen values and Eigen vectors of  $\begin{pmatrix} 1 & 2 & 1 \\ 6 & -1 & 0 \\ -1 & -2 & -1 \end{pmatrix}$
5. Find the Eigen values and Eigen vectors of  $\begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$
6. Verify Cayley-Hamilton theorem for the matrix  $\begin{pmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{pmatrix}$  and compute  $A^4$  and  $A^{-1}$

7. Verify Cayley-Hamilton theorem for the matrix  $\begin{pmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$  and compute  $A^{-1}$
8. Find the Characteristic equation of the matrix  $A = \begin{pmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{pmatrix}$  and hence find the matrix represented by  $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$
9. Using Cayley-Hamilton theorem for the matrix  $\begin{pmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{pmatrix}$  and compute  $A^{-1}$
10. Using Cayley-Hamilton theorem , find the inverse of the matrix  $A = \begin{pmatrix} -1 & 0 & 3 \\ 8 & 1 & 7 \\ -3 & 0 & 8 \end{pmatrix}$