



## DEPARTMENT OF MATHEMATICS

### 23MAT101 – MATRICES AND CALCULUS

#### UNIT I – MATRIX EIGEN VALUE PROBLEMS

##### PART A QUESTIONS

1. Find the Characteristic equation of the matrix  $\begin{pmatrix} 1 & 4 \\ 2 & 3 \end{pmatrix}$
2. The product of two Eigen values of the matrix  $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$  is 16. Find the third Eigen value of A.
3. The Eigen value of the matrix  $\begin{bmatrix} 11 & -4 & -7 \\ 7 & -2 & -5 \\ 10 & -4 & -6 \end{bmatrix}$  are 0 and 1. Find the other Eigen value.
4. Find the Characteristic equation of the matrix  $\begin{pmatrix} 1 & 2 \\ 0 & 2 \end{pmatrix}$  and get the Eigen Values
5. If 3 and 6 are two eigenvalues of  $A = \begin{pmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{pmatrix}$ , write down all the eigen values of  $A^{-1}$
6. If the sum of two eigenvalues and the trace of a  $3 \times 3$  matrix A are equal, find the value of  $|A|$
7. Two Eigen values of  $A = \begin{bmatrix} 4 & 6 & 6 \\ 1 & 2 & 2 \\ -1 & -5 & -2 \end{bmatrix}$  are equal and they are double the third. Find the Eigen values of  $A^2$



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8. For a given matrix A of order 3,  $|A| = 32$  and two of its eigenvalues are 8 and 2.
9. State Cayley – Hamilton theorem.
10. Use Cayley- Hamilton theorem to find  $(A^4 - 4A^3 - 5A^2 + A + 2I)$  when  $\begin{pmatrix} 1 & 2 \\ 4 & 3 \end{pmatrix}$