UNIT-2: Eigen values and Eigen vectors

S.NO	Questions	BT	CO	PO
	Part – A(Short answer questions)			
1	Define model and spectral matrices.	L1	CO2	PO1
2	Find the sum and product of the Eigen values of $A=\begin{bmatrix}2 & 3 & -2\\ -2 & 1 & 1\\ 1 & 0 & 2\end{bmatrix}$	L2	CO2	PO1
3	Using Cayley Hamilton theorem find A^8, if $A=\begin{bmatrix}1 & 2\\ 2 & -1\end{bmatrix}$.	L2	CO2	PO2
4	Find the Eigen values of A^{-1} where $A=\begin{bmatrix}2 & 3 & 4\\ 0 & 4 & 2\\ 0 & 0 & 3\end{bmatrix}$	L2	CO2	PO1
5	Find the symmetric matrix corresponding to the quadratic form $x^2 + 6xy + 5y^2$.	L1	CO2	PO2
6	Find the characteristic roots of the matrix $A=\begin{bmatrix}2 & 2 & 1\\ 1 & 3 & 1\\ 1 & 2 & 2\end{bmatrix}$	L2	CO2	PO1
7	Compute the Eigen values and Eigen vectors of $\begin{bmatrix}1 & 4\\ 3 & 2\end{bmatrix}$	L2	CO2	PO1
8	Prove that zero is eigen value of a matrix iff it is singular.	L2	CO2	PO1
9	Find the eigenvalues of the Matrix A^2+3I, where $A=\begin{bmatrix}1 & 0\\ 6 & 3\end{bmatrix}$.	L2	CO2	PO2
10	State Cayley – Hamilton theorem.	L1	CO2	PO1

S.NO	Part-B (Long answer questions)	BT	CO	PO
1	Find the Eigen values and Eigen vectors of a Matrix $A=\begin{bmatrix}8 & -6 & 2\\ -6 & 7 & -4\\ 2 & -4 & 3\end{bmatrix}$	L3	CO2	PO2
2(a)	Show that the matrix $A=\begin{bmatrix}1 & -2 & 2\\ 1 & -2 & 3\\ 0 & -1 & 2\end{bmatrix}$ satisfies its characteristic equation hence find A^{-1}.	L2	CO2	PO2
2(b)	Verify Cayley Hamilton theorem for the matrix $A=\begin{bmatrix}8 & -8 & 2\\ 4 & -3 & -2\\ 3 & -4 & 1\end{bmatrix}$	L3	CO2	PO1
3(a)	Find the Eigen values of $3A^3+5A^2-6A+2I$ for the	L2	CO2	PO1

	matrix $A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & 3 & 2 \\ 0 & 0 & -2 \end{bmatrix}$			
3(b)	Verify Cayley Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ and hence find A^4 .	L3	CO2	PO1
4	Diagonalize the matrix$A = \begin{bmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix}$	L3	CO2	PO3
5	Reduce the Quadratic form $3x_1^2 + 3x_2^2 + 3x_3^2 + 2x_1x_2 + 2x_1x_3 - 2x_2x_3$ into Canonical form and hence state nature, rank, index and signature of the Quadratic form.	L4	CO2	PO3
6	Diagonalize the matrix $A = \begin{bmatrix} 3 & 1 & 1 \\ 1 & 3 & -1 \\ 1 & -1 & 3 \end{bmatrix}$ by Orthogonal Reduction.	L3	CO2	PO3
7	Find the Eigen values of A^2 if $A = \begin{bmatrix} 1 & 2 & 0 \\ 0 & 2 & 1 \\ 0 & 0 & 1 \end{bmatrix}$	L2	CO2	PO2
8	Diagonalize the matrix$A = \begin{bmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix}$ and find A^4 using modal matrix P	L3	CO2	PO2
9	Show that the matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ satisfies its characteristic equation hence find A^{-1} and A^4	L2	CO2	PO3
10	Find the Eigen values and Eigen vectors of a Matrix $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$	L1	CO2	PO2
11	Verify Cayley Hamilton theorem for the matrix $A = \begin{bmatrix} 3 & 0 & 0 \\ 5 & 4 & 0 \\ 3 & 6 & 1 \end{bmatrix}$ and hence find A^{-1} .	L2	CO2	PO2