SNS COLLEGE OF TECHNOLOGY

(An [logo] Autonomous Institution, Affiliated to Anna University)

Coimbatore – 641 035.

Internal Assessment- I

AcademicYear2023-2024(Odd)

First Semester

23MAT101-MATRICES AND CALCULUS

(REGULATION 2023)

(Common to all branches)

B

Time:1.30Hours　　　　　　　　　　　　　　　　　**MaximumMarks:50**

	PART – A(5 x 2 = 10 MARKS)	CO	BLOOMS
	ANSWERALLQUESTIONS		
1.	Dissect the characteristic equation of the matrix $\begin{bmatrix} 7 & -2 & 0 \\ -2 & 6 & -2 \\ 0 & -2 & 5 \end{bmatrix}$	CO1	(Rem)
2.	Find the Eigen value of adj(A) if $A = \begin{bmatrix} 3 & 2 & 1 \\ 0 & 4 & 2 \\ 0 & 0 & 1 \end{bmatrix}$	CO1	(Und)
3.	If 3 and 15 are two eigen values of $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$, find |A|, without expanding the determinant.	CO1	(Rem)
4.	Infer the matrix form of the quadratic form of $x_1^2 + 2x_2^2 + x_3^2 - 2x_1x_2 + 2x_2x_3$	CO2	(Rem)
5.	Discuss the rank, index, signature, and nature of $y_1^2 + 3y_2^2 - 4y_3^2$	CO2	(Und)
	PART – B (13+13+14= 40 MARKS) **ANSWERALLQUESTIONS**		
6. a)i)	Interpret the Eigen value and Eigen vector of $A = \begin{bmatrix} 11 & -4 & -7 \\ 7 & -2 & -5 \\ 10 & -4 & -6 \end{bmatrix}$	CO1	(App) (10)
ii)	List out the applications of Eigen value in real life.	CO1	(App) (3)
	(or)		
b)	Test whether the matrix $A = \begin{bmatrix} 1 & 0 & -1 \\ 2 & 1 & 1 \\ 1 & 0 & -2 \end{bmatrix}$ satisfies its own characteristics equation and also compute itsA^4 and A^{-1}.	CO1	(App) (13)

7.	a)	Diagonalize the matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ by means of orthogonal transformation.	CO2	(App) (13)
		(or)		
	b)	Obtain an orthogonal transformation which will transform the quadratic form $x_1^2 + 2x_2^2 + x_3^2 - 2x_1x_2 + 2x_2x_3$ into sum of squares.	CO2	(App) (13)
8.	a)	What is the number of females in each class after 2, 4, and 6 years if each class initially consists of 400 females each. Let the Leslie matrix be $\begin{bmatrix} 0 & 2.3 & 0.4 \\ 0.6 & 0 & 0 \\ 0 & 0.3 & 0 \end{bmatrix}$ and find its distribution vector and its rate of change.	CO1	(Ana) (14)
		(or)		
	b)	Reduce the quadratic form $2x_1^2 + x_2^2 + x_3^2 + 2x_1x_2 - 4x_2x_3 - 2x_1x_3$ to canonical form by orthogonal reduction. Determine its nature, rank, signature, index and find a set of non-zero value for x_1, x_2, x_3 for which the above quadratic form is zero.	CO2	(App) (14)

Rem/Und: Remember/Understand   **App:** Apply   **Ana**: Analyze   **Eva:** Evaluate   **Cre:** Create

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Prepared by   **Verified by**   **Dean(S&H)**