LNCT- UNIVERSITY

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Enroll No....

Class Roll No.....

2nd MID SEM EXAMINATION (JAN - 2024) B.TECH I SEM Engg. Mathematics-I - [BT-102] **BRANCH-COMMON FOR ALL BRANCH**

Time: 1:30 Hrs

Max Marks:20

NOTE: Attempt any four Questions each carry equal marks. Choose minimum two questions from each sections.

Section- A

Que.1 Find the Characteristic roots for the matrix

$$A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$
. Also Find Eigen Vector when Eigen value is 15. **[CO-5]**

Que2. Verify the Cayley-Hamilton theorem if
$$A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$$
. [CO-5]

Que3. Find the rank and nullity of the matrix

$$A = \begin{bmatrix} 1 & 3 & 4 & 3 \\ 3 & 9 & 12 & 9 \\ 1 & 3 & 4 & 1 \end{bmatrix}$$
 [CO-5]

Que4. Define Fuzzy Set and Membership function.

[CO-4]

Section-B

Que. 5 Solve
$$(1+x^2) \frac{dy}{dx} + y = e^{\tan^{-1}x}$$
. [CO-3]

Que6. Solve
$$\frac{d^2y}{dx^2} + 31 \frac{dy}{dx} + 240 y = 272e^{-x}$$
. [CO-3]

Que7. Solve
$$(D^2 - 3D + 2)y = sin3x$$
. [CO-3]

Que8. Define MATLAB. Also explain the advantage and disadvantage of [CO-4]MATLAB.