LNCT- UNIVERSITY

Total No. of Questions: 8] **[Total No. of Printed pages: 1]**

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 MATLAB. **[CO-4]**