JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2023

B.Tech-VII Semester (CSE/IT/ECE/CE/BTBI)

COURSE CODE(CREDITS): L-18B1WCI740 (3) MAX. MARKS: 15

COURSE NAME: Computational Techniques and Algorithms in Engineering

COURSE INSTRUCTORS: Dr. Rakesh Kanji MAX. TIME: 1 Hour

Note: (a)Marks are indicated against each question in square brackets. Attempt any 5 questions.

Q1. What is rank given a system of equations or matrix? How you relate a system is good with rank information with an example? [1+2] [CO1]

Q2. What does represent row in a matrix? Which of the space Gaussian elimination use row space or column space to find out solutions? Can we apply Gaussian elimination on rectangular matrix with some modification? [1+1+1] [CO1]

Q3. Perform LU decomposition of below matrix. What is the minimum number of iteration is required for below matrix? [2+1] [CO1, CO2]

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 2 \\ 0 & 3 & 0 \end{bmatrix}$$

Q4. Explain the rank-nullity theorem. Show any use of such theorem. [2+1] [CO1, CO2]

Q5. Formulate the diagonal entry of L matrix for Cholsky decomposition and complexity. [2+1] [CO1, CO2]

Q6. Provide a matrix for an elementary row operation at A_23 and A_22. Please use below matrix. [1.5+1.5] [CO1, CO2]

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 2 \\ 0 & 3 & 4 \end{bmatrix}$$

Q7. Find out the solutions for below matrix . [3][CO2]

$$\begin{bmatrix} 2 & 1 & 0 \\ 1 & 0 & 2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$