

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -1 EXAMINATION- 2024

B. Tech.-I Semester (BI/BT)

COURSE CODE (CREDITS): 24B11MA112

MAX. MARKS: 15

COURSE NAME: MATHEMATICS FOR LIFE SCIENCES-I

COURSE INSTRUCTORS: MDS

MAX. TIME: 1 Hour

Note: (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q1. If $A = \begin{bmatrix} 3 & 2 & 0 \\ 1 & 4 & 0 \\ 0 & 0 & 5 \end{bmatrix}$, compute $A^2 - 7A + 10I$, (where I is the unit matrix of order 3×3).

CO-1 [3]

Q2. Solve the following system of linear equations by using Gauss elimination method

CO-1 [3]

$$2x + 4y + z = 3$$

$$3x + 2y - 2z = -2$$

$$x - y + z = 6$$

Q3. Reduce the following matrix to the row echelon form, and find its rank.

CO-1 [3]

$$\begin{pmatrix} 1 & 2 & 3 & -4 \\ -2 & 3 & 7 & -1 \\ 1 & 9 & 16 & -13 \end{pmatrix}$$

Q4. Construct a 3×3 matrix, whose elements are given by

CO-1 [3]

$$a_{ij} = \begin{cases} \frac{(i+j)^2}{2}, & \text{When } i \geq j, \\ 0, & \text{When } i < j, \end{cases}$$

where $i, j = 1, 2, 3$, and hence find the minors for the elements a_{22} and a_{31} .

Q5. Find the eigenvalues of A^2 , if $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$.

CO-1 [3]