JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

B.Tech-I Semester (BT/BI)

COURSE CODE (CREDITS): 25B11MA112 (4) MAX. MARKS: 25

COURSE NAME: MLS-I

COURSE INSTRUCTORS: PKP MAX. TIME: 1 Hour 30 Min

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems.

Q.No	Question	CO	Marks
Q1	Express the matrix $A = \begin{bmatrix} 4 & 2 & 1 \\ 0 & 8 & 3 \\ 6 & 2 & 4 \end{bmatrix}$ as a sum of symmetric and skew symmetric matrix.	1	4
Q2	Find the rank of matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ 3 & 6 & -3 \\ 2 & 4 & -3 \end{bmatrix}$.	1	4
Q3	Solve the following system by Cramer's rule: $x + y + 2z = 6,\ x + 2y + z = 9,\ 2x - y + 3z = 1.$	1	5
Q4	State the Cayley-Hamilton theorem and verify it for the matrix $A = \begin{bmatrix} 4 & 2 \\ 1 & 3 \end{bmatrix}$.	1	4
Q5	Find the eigenvalues and eigenvectors of $A = \begin{bmatrix} 4 & -2 \\ 1 & 1 \end{bmatrix}$.	1	4
Q6	(a) Evaluate $\frac{d}{dx}(4x^3 - 2x^2 + 5e^{2x} + \sin x)$. (b) Suppose the blood pressure (in mm Hg) at t seconds is given by: $P(t) = 21\,(\cos 2\pi t) + 120$ Compute the blood pressure at $t = 1/4$ & $t = 1/2$ seconds.	2	2+2

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