JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Make-up Examination-Nov-2025

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

COURSE NAME: Mathematics for Life Sciences-I

COURSE INSTRUCTORS: P K Pandey MAX. TIME: 1 Hour 30 Minutes

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

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

Q.No.	Question	CO	Marks
Q1	For $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ and $B = \begin{bmatrix} -29 & 18 & 5 \\ 18 & -15 & 2 \\ 5 & 2 & -1 \end{bmatrix}$, compute AB.	1	4
Q2	Solve the following system by Cramer's rule: $2y + x + z = 9,\ y + x + 2z = 6\ 2x - y + 3z = 1.$	1	4
Q3	State the Cayley-Hamilton theorem and verify it for the matrix $A = \begin{bmatrix} 4 & 2 \\ 1 & 3 \end{bmatrix}$.	1	4
Q4	Using row echelon form, find the rank of matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ 3 & 6 & 3 \\ 2 & 4 & -3 \end{bmatrix}$.	1	4
Q5	Find the eigenvalues and eigenvectors of $A = \begin{bmatrix} 5 & 2 \\ 1 & 4 \end{bmatrix}$.	1	5
Q6	(a) Suppose the melatonin level (in t hours) is given by: $M(t) = 10 + 4\sin\frac{2\pi t}{24}$. Find t for $M(t) = 12$. (b) Evaluate $\frac{d}{dx}(5e^{2x} - 8x^3 + 2\sin x)$.	2	2+2

***