COURSE CODE (CREDITS): 24B11MA112 (4)   MAX. MARKS: 25

COURSE NAME: MATHEMATICS FOR LIFE SCIENCES-I

COURSE INSTRUCTORS: MDS   MAX. TIME: 1 Hour 30 Minutes

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	Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & -2 \\ 1 & 4 \end{bmatrix}$ and hence find A^{-1}.	CO-1	4
Q2	Test the continuity of the function $f(x)$ at $x = 1$, where $$f(x) = \begin{cases} \dfrac{x^2 - 4x + 3}{x^2 - 1}, & x \neq 1 \\ 2, & x = 1. \end{cases}$$	CO-2	3
Q3	In a class of 30 students, 14 has taken mathematics, 10 has taken mathematics but not economics. Find the number of students who had taken mathematics and economics, also find the number of students who had taken economics but not mathematics?	CO-2	4
Q4	(a) Differentiate the functions $y = e^x \sin(\log_e(x^2 + 3x + 7))$ with respect to x. (b) If $y = \sqrt{x} + \dfrac{1}{\sqrt{x}}$, then show that, $2x\dfrac{dy}{dx} = \sqrt{x} - \dfrac{1}{\sqrt{x}}$.	CO-2	4+3
Q5.	Find all the solutions of the cubic equation $z^3 = -2 + 2i$.	CO-3	3
Q6.	Find the conjugate of $$\dfrac{(5 - 3i)(3 + 5i)}{(1 + 2i)(2 - 1i)}.$$	CO-3	4