JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

M.Sc-I Semester (BT/MB)

COURSE CODE (CREDITS):20MS1MA111(02) MAX. MARKS: 25

COURSE NAME: Basics of Mathematics and Statistics

COURSE INSTRUCTORS: NKT 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	Marks
Q1	Simplify $\cos\theta \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix} + \sin\theta \begin{bmatrix} \sin\theta & -\cos\theta \\ \cos\theta & \sin\theta \end{bmatrix}$	2
Q2	If $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$, then show that A is the root of the polynomial $f(x) = x^3 - 6x^2 + 7x + 2$	3
Q3.	For what value of x, the matrix $A = \begin{bmatrix} x-1 & 1 & 1 \\ 1 & x-1 & 1 \\ 1 & 1 & x-1 \end{bmatrix}$ is singular.	6
Q4.	Solve the following system of the linear equations by Cramer's rule $x - 4y - z = 11$, $2x - 5y + 2z = 39$, $-3x + 2y + z = 1$	6
Q5.	Simplify $\left(\frac{3+2i}{2-3i}\right) + \left(\frac{3-2i}{2+3i}\right)$	4
Q6	Find the real values of x *and* y if $(1+i)(x+iy) = 2 - 5i$	4