JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

M.Sc-I Semester (BT/MB)

COURSE CODE (CREDITS): 20MS1MA111 (02) MAX. MARKS: 35

COURSE NAME: Basics of Mathematics and Statistics

COURSE INSTRUCTOR: NKT MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

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

(c) Simple calculators are allowed.

Q.No	Question	Marks
Q1.	If $A = \begin{bmatrix} 2 & -3 & -5 \\ -1 & 4 & 5 \\ 1 & -3 & -4 \end{bmatrix}, B = \begin{bmatrix} -1 & 3 & 5 \\ 1 & -3 & -5 \\ -1 & 3 & 5 \end{bmatrix}$, Show that $AB = BA$	3
Q2.	Show that $\begin{vmatrix} b-c & c-a & a-b \\ c-a & a-b & b-c \\ a-b & b-c & c-a \end{vmatrix} = 0$	3
Q3.	Solve the system of linear equations using Cramer's rule $2x - 3y - 4z = 29$ $-2x + 5y - z = -15$ $3x - y + 5z = -11$	4
Q4.	Find the conjugate of the complex number $\frac{(1+i)(2+i)}{3+i}$	3
Q5.	Find the real values of x *and* y if $(x + iy)(2 - 3i) = 4 + i$	3
Q6.	Find $\frac{d}{dx}\left[\frac{e^x+e^{-x}}{e^x-e^{-x}}\right]$	3
Q7.	Evaluate $\int \frac{dx}{(x-2)(x-3)}$	3

Q8.	For the data 150 | 200 | 250 | 220 | 180 | 400 | 650 | 309 | 295 | 105 Find mean, median and standard deviation.	4
Q9.	Find the coefficient of correlation(r) between the age of husband and wife from the following data Age of Husband: 35, 34, 40, 43, 56, 20, 38 Age of wife: 32, 30, 31, 32, 53, 20, 33	4
Q10.	(a) Differentiate between isometric and allometric growth. (b) What is the relationship of K,N and r in population dynamics. Give an example. (c) Write a CRN equation input species$(X_1, X_2, \ldots, X_N)$ and multiple output$(O_1, O_2, \ldots . O_m)$.Take appropriate propensity of reaction. What type of reaction cannot be modeled for CRN.	1+2+2