JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2024

M.Sc.-I Semester (BT/BI)

COURSE CODE (CREDITS): 20MS1MA111 (2) MAX. MARKS: 35

COURSE NAME: BASICS OF MATHEMATICS & STATISTICS

COURSE INSTRUCTORS: PKP 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

Q.No.	Question	Marks
Q1	Differentiate between J shaped and S shaped population curves and find out their relationship with carrying capacity - K.	3
Q2	(a). Consider the given a simple CRN $A + B \xrightarrow{K_1} C$ $C \xrightarrow{K_2} A + B$ Write the rate equations for the concentrations of A, B, and C. (b). What can CRN not model?	2+1
Q3	Justify that mathematical modeling is worthwhile to model biological systems. Demonstrate with examples modeling has made a difference in circadian rhythm.	4
Q4	Find the mean for the systolic blood pressures (mm Hg) for given data Systolic BP: 90-100 | 100-110 | 110-120 | 120-130 | 130-140 | 140-150 No. of persons: 15 | 25 | 30 | 20 | 10 | 5	4
Q5	Using Cramer's rule solve the system of equations: $4x + 3y + 2z = 8, \quad -x + 2z = 12, \quad 3x + 2y + z = 3$	4
Q6	From the given data obtain the regression equation of y on x (using normal equations): x: 6 | 2 | 10 | 4 | 8 y: 9 | 11 | 5 | 8 | 7	4
Q7	Given that $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 2 \\ 1 & 2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 3 & -1 \\ -3 & 1 & 2 \end{bmatrix}$. Compute AB and BA. Also answer whether $AB = BA$ or not?	4

MID TERM EXAMINATION DEC-2024

Q8	Find the sum of first 22 terms of the sequence $-7, -2, 3, 8, \cdots$ and also compute 20^{th} term of the sequence.	3
Q9	(a) Evaluate $\int \left(3x^{\frac{1}{2}} + 5\cos x\right) dx$ (b) A family has 2 children. Given that one child is a boy, what is the probability that other child is a girl.	3
Q10	Express $\frac{(2-8i)(7+8i)}{(1+i)}$ in form of $(a + i\,b)$ and also compute its modulus.	3

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UNIT TEST-3 EXAMINATION- Dec-2024