Reg. No ..... Name **25INT314**

END SEMESTER EXAMINATION- OCTOBER 2025

SEMESTER 3 : INTEGRATED M.Sc. PROGRAMME COMPUTER SCIENCE- DATA SCIENCE

COURSE : **21UP3CRMCP09 : R PROGRAMMING AND MATHEMATICS FOR ARTIFICIAL INTELLIGENCE**

(For Regular - 2024 Admission and Improvement/Supplementary 2023/2022/2021 Admissions)

Time : Three Hours Max. Weightage: 30

PART A
Answer any 8

1. Write about lists in R
2. List the common probability distributions used in R
3. Mention any two rules of inference
4. Give any two applications of PCA
5. Calculate the dot product of two vectors A=3i+5j+4k, B=2i+7j+5k
6. List the functions to generate binomial distribution.
7. Discuss any two set operations in R
8. Define contrapositive
9. Define eigen value
10. Define cosine similarity

(1 x 8 = 8 Weight)

PART B
Answer any 6

11. Write about arithmetic operators briefly
12. Write a program in R to find the factors of a number using for loop
13. With the help of examples describe echelon form and row reduced echelon form
14. Differentiate between univariate and multivariate plots
15. Describe vector projection with the help of a diagram
16. Find the dual of each of these compound propositions.
    a) $(p \wedge \neg q) \vee (q \wedge F)$
    b) $(p \vee F) \wedge (q \vee T)$
17. Explain correlation coefficient with a simple example
18. Explain cross-product of a matrix with an example

(2 x 6 = 12 Weight)

PART C
Answer any 2

19. Explain in detail the concept of matrices by incorporating all of its advanced operations
20. Explain the arithmetic operators in R with examples

21. a) State what does it mean for two propositions to be logically equivalent.
b) Describe the different ways to show that two compound propositions are logically equivalent.
c) Show in at least two different ways that the compound propositions $\neg p \vee (r \rightarrow \neg q)$ and $\neg p \vee \neg q \vee \neg r$ are equivalent

22. Explain consistency and inconsistency of linear system of equations

(5 x 2 = 10 Weight)