K25P 3324

Reg. No. : .....

Name : .....

III Semester M.C.A. Degree (C.B.S.S. – Reg./Supple./Imp.) Examination, November 2025
(2022 Admission Onwards)
MCA3 C04 : PRINCIPLES OF INTELLIGENT SYSTEMS

Time : 3 Hours Max. Marks : 60

PART – A

Answer **all** questions. **Each** question carries **two** marks.

1. Define a neuron in the context of Artificial Neural Networks.
2. Differentiate between supervised and unsupervised learning.
3. Define the role of energy function in hopefield network.
4. Explain the role of attractors in hopefield network.
5. Define overfitting.
6. Explain the historical perspective of fuzzy logic.
7. Define a membership function.
8. Explain fuzzy inference system.
9. Define a Genetic Algorithm.
10. List two core genetic operators. **(10×2=20)**

PART – B

Answer **all** questions. **Each** question carries **eight** marks.

11. a) Explain the fundamental concepts of evolutionary computing and its significance in intelligent systems.

OR

b) Analyze the Back-propagation network. Describe its architecture and elaborate on its training algorithm, highlighting its advantages.

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12. a) Describe the architecture and working principle of an Adaptive Resonance Network. Analyze how it solves the stability-plasticity dilemma.

OR

b) Explain the theory and algorithm of Kohonen Self-Organizing feature maps. Illustrate with a diagram how the map organizes itself to learn patterns.

13. a) Explain the fundamental concepts of Fuzzy Set Theory and discuss how it addresses uncertainty and imprecision.

OR

b) Analyze the various operations on fuzzy sets, such as complement, union and intersection, using both graphical representations and mathematical formulas.

14. a) Explain the core components of a Fuzzy Logic System. Analyze how fuzzification, inference and defuzzification work together to produce a crisp output.

OR

b) Analyze the different types of membership functions (triangular, trapezoidal, Gaussian) and evaluate their suitability for various applications.

15. a) Explain the working principle of a Genetic Algorithm step-by-step. Analyze the role of each component (population, fitness function, selection, crossover, mutation).

OR

b) Describe the key genetic operators in detail. Evaluate how they contribute to the search for an optimal solution.

- Selection
- Crossover
- Mutation.

(5×8=40)