



QP CODE: 25803000



25803000

Reg No :

Name :

INTEGRATED MSC DEGREE EXAMINATION, JUNE 2025

Eight Semester

INTEGRATED MSC COMPUTER SCIENCE-ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING

ELECTIVE - ICSA8EB1 - SOFT COMPUTING TECHNIQUES

2020 Admission Onwards

626E6025

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

Weight 1 each.

1. What is Evolutionary Programming (EP)?
2. Explain the concept of kernel functions in SVMs.
3. State one advantage of SVMs over traditional neural networks.
4. What is the role of a fitness function in Genetic Algorithms? Provide an example.
5. What is crossover in Genetic Algorithm? Provide a brief explanation of how crossover enhances the exploration and exploitation phases.
6. Explain the concept of fuzzy addition and fuzzy subtraction. How are these operations performed on fuzzy sets?
7. Explain the concept of a fuzzy equivalence relation. How does it generalize the notion of equivalence from classical set theory?
8. Discuss the role of composition operations in fuzzy relations. How are max-min and max-product compositions applied in fuzzy relational calculus?
9. What is a hybrid system in the context of soft computing? Provide an example of how hybrid systems combine different computational techniques.
10. How does Genetic Algorithm (GA) optimize the parameters of a Fuzzy Logic Controller (FLC) for improved performance?

(8×1=8 weightage)





Part B (Short Essay/Problems)

*Answer any **six** questions.*

Weight 2 each.

11. Discuss the application of genetic algorithms in optimization problems. Provide a specific example to illustrate their effectiveness.
12. Briefly explain the differences between feedforward and recurrent neural networks. Provide one application for each type.
13. Describe the purpose of the loss function in backpropagation neural networks.
14. Describe the structure and functioning of a Bi-directional Associative Memory (BAM). How does BAM facilitate bidirectional recall of patterns stored in the network?
15. What are the typical stopping criteria used to terminate a genetic algorithm? Provide examples of criteria based on fitness evaluations and generation limits.
16. Describe the concept of equivalence relation in Classical Sets. How is equivalence relation defined and applied differently in Fuzzy Sets?
17. Describe the process of approximate reasoning in fuzzy logic. How does approximate reasoning facilitate decision-making in uncertain or imprecise environments?
18. Compare and contrast the characteristics of Fuzzy ArtMap with other neural network models in terms of learning efficiency and application domains.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

Weight 5 each.

19. Explain the principles of Adaptive Resonance Theory (ART) neural networks. Discuss the architecture and functioning of ART-1 and ART-2 networks, highlighting their mechanisms for category learning and recognition. Compare and contrast ART networks with other clustering algorithms.
20. Explain the role of bitwise operators in Genetic Algorithm. Provide examples of how bitwise operators are used for encoding and manipulating solutions in binary representation.
21. Describe the composition of fuzzy relations. Explain how the composition operation is defined for fuzzy relations and discuss its significance in fuzzy logic applications.
22. Compare and contrast Fuzzy Backpropagation (BP) with traditional backpropagation algorithms in terms of architecture, learning process, and applicability to uncertain or imprecise data.

(2×5=10 weightage)

