(T) Roll No. .....

PAPER ID—11449

B. Tech. EXAMINATION, 2025

(Sixth Semester)

COMPUTER SCIENCE AND ENGINEERING

Soft Computing

Professional Elective Course-II

Time : 3 *Hours* *Maximum Marks* : 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

1. (a) List any *two* constituents of soft computing. 2

(b) How is soft computing different from hard computing ? 2

(c) Define fuzzy relation with an example. 2

(d) State one application of fuzzy decision-making. 2

(e) Define a feedforward neural network. 2

(f) List *two* recent advancements in neural networks. 2

(g) What is crossover in genetic algorithms ? 2

Unit I

2. (a) Explain the evolution of computing from hard computing to soft computing. Include key milestones. 7

(b) Explain the role of fuzzy logic, artificial neural networks and genetic algorithms in soft computing. 7

3. (a) How does machine learning contribute to soft computing ? Explain with use cases. 7

(b) Compare rule-based AI systems with learning-based computational intelligence systems. 7

Unit II

4. (a) Explain fuzzy relations and how are they used in fuzzy logic systems ? Provide examples. 7

(b) Explain, how fuzzy logic handles uncertainty and imprecision in data. 7

5. (a) Describe the various operations that can be performed on fuzzy sets with suitable diagrams or truth tables. 7

(b) Discuss fuzzy rules and fuzzy reasoning. Explain, how are they applied in fuzzy systems. 7

Unit III

6. (a) What is an adaptive network ? Explain how it updates based on input data. 7

   (b) Describe Adaptive Resonance Theory (ART) and how it solves the stability-plasticity dilemma ? 7

7. (a) Discuss supervised, unsupervised, and reinforcement learning in neural networks. Give examples. 7

   (b) Compare supervised learning and unsupervised learning with examples and use cases. 7

Unit IV

8. Compare genetic algorithms with traditional search and optimization methods. Why are GAs preferred in some cases ? 14

9. How are genetic algorithms applied to solve optimization problems in machine learning ? Provide use cases. **14**

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