

B. TECH. (MINOR) CBCS-2023  
B. TECH. (MINOR) Semester-I (Sem-III Level) Artificial Intelligence & Data Science : WINTER:  
2025  
SUBJECT: SOFT COMPUTING

Day : Tuesday  
Date : 23/12/2025

W-29442-2025

Time : 10:00 AM-01:00 PM  
Max. Marks : 60

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the **RIGHT** indicate **FULL** marks.
- 3) Assume suitable data **WHEREVER** necessary.
- 4) Draw neat diagrams **WHEREVER** necessary.

- Q.1 Define Soft Computing and describe its significance in solving complex real-world problems. (10)
- OR
- Q.1 Explain the basic concepts of fuzzy logic, neural networks, and evolutionary algorithms, and discuss their roles in Soft Computing. (10)
- Q.2 Define a biological neuron and describe how it inspires the design of artificial neurons. (10)
- OR
- Q.2 Illustrate how the McCulloch-Pitts neuron model can be used to implement logical AND and OR functions. (10)
- Q.3 Define a Self-organizing Feature Map (SOM) and describe its primary function in neural networks. (10)
- OR
- Q.3 Describe the Learning Vector Quantization (LVQ) algorithm and how it refines the classification boundaries in neural networks. (10)
- Q.4 Explain the concept of genetic evolution and its relevance to genetic algorithms. (10)
- OR
- Q.4 Compare the terminology used in biology with that used in genetic algorithms, such as genes, chromosomes, and crossover. (10)
- Q.5 Explain the steps involved in the Differential Evolution (DE) algorithm and discuss the role of mutation, crossover, and selection in solving optimization problems. (10)
- OR
- Q.5 Discuss how Ant Colony Optimization (ACO) mimics real ant behavior to solve combinatorial optimization problems. Explain the significance of pheromone trails in guiding the search. (10)
- Q.6 Define a fuzzy number and explain its significance in fuzzy logic. (10)
- OR
- Q.6 Illustrate the basic operations on fuzzy sets and how they differ from traditional set operations. (10)

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