

B.TECH
(SEM IV) THEORY EXAMINATION 2022-23
INTRODUCTION TO SOFT COMPUTING

*Time: 3 Hours**Total Marks: 100***Note:** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief. 2 x 10 = 20**

- (a) How does a multilayer perceptron differ from a single-layer perceptron?
- (b) Discuss the purpose of a Hopfield network.
- (c) Explain the concept of membership function in fuzzy sets.
- (d) How are fuzzy relations different from crisp relations?
- (e) Discuss data clustering algorithms.
- (f) Discuss neuro-fuzzy controls.
- (g) Elaborate the significance of survival of the fittest in the evolutionary process.
- (h) How does mutation introduce random changes in individuals' genetic material?
- (i) Discuss a hybrid fuzzy controller.
- (j) Discuss the Traveling Salesman Problem (TSP).

SECTION B**2. Attempt any three of the following: 10x3=30**

- (a) Discuss the role of back propagation in training a neural network?
- (b) Describe how fuzzy logic help in decision making under uncertainty?
- (c) How do evolutionary algorithms simulate natural evolution for problem-solving?
- (d) Discuss the rank method to assign a fitness value to individuals based on their rank in the population?
- (e) Discuss soft computing techniques implemented in MATLAB?

SECTION C**3. Attempt any one part of the following: 10x1=10**

- (a) Explain the process of learning in Kohonen's self organizing network with suitable example.
- (b) Discuss Hopfield network store and retrieve information with suitable example.

4. Attempt any one part of the following: 10x1=10

- (a) Explain the fuzzy languages and how it is processed in fuzzy automata.
- (b) Discuss the handling of uncertainty in inputs and outputs using fuzzy functions.

5. Attempt any one part of the following: 10x1=10

- (a) Discuss the method of grouping similar data points together using clustering algorithms.
- (b) How does simulated annealing work as an optimization technique?

6. Attempt any *one* part of the following: 10x1=10

- (a) What role does fitness computation play in the evolutionary process?
- (b) How does the rank space method utilize the concept of rank to guide the search process?

7. Attempt any *one* part of the following: 10x1=10

- (a) How does a genetic algorithm solve the TSP?
- (b) How does the genetic algorithm approach is different from the traditional search techniques?

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