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 Kohnen'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?