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Roll No.

MCA
(SEM IV) THEORY EXAMINATION 2022-23
SOFT COMPUTING

Time: 3 Hours *Total Marks: 100*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. **Attempt *all* questions in brief.** **2 x 10 = 20**

a. What is the necessity of activation function?

b. Define the term learning rate parameter.

c. What is meant by competitive learning?

d. What is the limitation of single layer perceptron model?

e. Briefly discuss Fuzzy max-product composition.

f. State any four properties of classical sets.

g. What is the need of encoding operation?

h. Define terms – chromosome and fitness function.

i. What is swarm intelligence?

j. Differentiate between Mamdanineuro-fuzzy model and Sugenoneuro-fuzzy model.

SECTION B

2. **Attempt any *three* of the following:** **10 x 3 = 30**

a. Describe basic building blocks of artificial neuron.

b. What is Hebb's learning rule and delta leaning rule? Explain. Also derive generalized delta learning rule.

c. Define the term membership function. What are its features? Explain how membership value assignment is performed using intuition and rank ordering.

d. Describe various types of selection methods used in Genetic algorithm.

e. What do you mean by adaptive neuro-fuzzy inference system? Discuss its architecture, forward and backward phases of learning.

SECTION C

3. **Attempt any *one* part of the following:** **10 x 1 = 10**

a. Explain constituents of soft computing. Also state any five differences between soft computing and hard computing.

b. Discuss structure of human brain with the help of a diagram.

4. **Attempt any *one* part of the following:** **10 x 1 = 10**

a. Discuss structure and training algorithm of Radial basis function network.

b. Explain application areas of Hopfield network. Also describe structure of discrete Hopfield network.

5. **Attempt any *one* part of the following:** **10 x 1 = 10**

a. Explain any five mathematical operators performed on fuzzy intervals.

b. Compare and state the necessity of fuzzification and defuzzification. Discuss any two defuzzification methods

6. **Attempt any *one* part of the following:** **10 x 1 = 10**

a. Discuss various crossover techniques with example.

b. Write general genetic algorithm. Discuss its advantages, limitations and applications.

7. **Attempt any *one* part of the following:** **10 x 1 = 10**

a. Explain different steps involved in Ant Colony optimization. Differentiate between local pheromone trial updation and global pheromone trial updation.

b. What is the importance of hybrid systems? Discuss and compare sequential, auxiliary and embedded hybrid systems.

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