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B. TECH
(SEM III) 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) What is Learning Rate?
(b) What is Soft Computing?
(c) Define Cell and Chromosomes.
(d) Explain the Difference between Fuzzy logic and Crisp Logic.
(e) What is Fuzzy Cartesian Product?
(f) Fuzzy Set A={(x1,0.2),(x2,0.9),(x3,0.4)} and Fuzzy Set B={(x1,0.4),(x2,0.5),(x3,0.2) find Disjunctive sum of Fuzzy Set A and B.
(g) Why do we use bias function in Neural Network?
(h) Discuss Complexity.
(i) Discuss Activation function. Define the Hard Limit with its input and output relationship.
(j) What do you mean by Membership Function? Make diagram for Triangular membership function.

SECTION B

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

(a) Discuss on realization of the AND function by using the Single Layer Perceptron.
(b) Explain important characteristics and applications of artificial neural network.
(c) What is Multi-Layer Perceptron? Also Explain the Applications of Soft Computing.
(d) What do you mean by Neuro Fuzzy? Explain in Brief.
(e) Define fuzzy Automata in brief.

SECTION C

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

(a) Construct KSOM to cluster 3 given vectors [1,0,1],[1,1,1],[1,0,1] and number of clusters to be formed is 2.Assume an initial learning Rate of 0.7.
(b) Solve A Back propagation Neural Network with two given inputs X1, X2= [0.09,0.10] and Weights which are connected to Hidden Layer H1 are[0.17,0.22] and Weights which are connected to Hidden Layer H2 are [0.27,0.32] with Bias b1=0.38. Weights which are connected to output Layer O1 are [0.42,0.47] and Weights which are connected to Output Layer O2 are [0.52,0.57] with Bias b2=0.64 and Desired outputs are O1, O2= [0.01,0.97]. Solve it with At least 1 Iteration, Assume the Learning

rate is 1.

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

(a) Write a short note on the following (i) Rank space method (ii) Genetic algorithm based Internet search techniques.

(b) Explain the terms Fuzzy Control, Neuro Fuzzy Control and Hybrid Fuzzy Control.

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

(a) What do you mean by Genetic Algorithm? Explain it with all phases and also draw flow chart.

(b) What is MATLAB? Also Explain modules of MATLAB System.

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

(a) Explain the term Rule base Structure Identification and Simulated Annealing.

(b) Explain Adaptive Network based Fuzzy Interface System with Mamdani Model.

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

(a) Explain in brief Fuzzification and Defuzzification.

(b) What is supervised learning and Unsupervised Learning? Explain both with Diagrams and Examples.