(Please write your Exam Roll No.) *Exam Roll No. .....*

END TERM EXAMINATION

EIGHT SEMESTER [B.TECH] JULY-2023

Paper Code: ETIT-410 ***Subject: Soft Computing***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt five questions in all including Q.No1 which is compulsory.

Q1 Answer the following questions: **(2.5x10=25)**

(a) Draw an architecture of Neural Networks and Explain?

(b) Differentiate Between Hard and Soft Computing.

(c) Explain the error correction process and gradient decent Rule?

(d) Explain the algorithm to store and recall a set of bipolar patterns in Hopfield Network.

(e) Differentiate between Feed Forward and Feed Backward Neural Networks?

(f) Explain about Fuzzy logic and its applications

(g) Define Uncertainty and its usefulness in Soft computing.

(h) Explain extension principle using suitable example.

(i) How Genetic algorithm is useful over simple Traditional algorithms. Why these algorithms are known as Genetic Algorithm?

(j) Explain Perception Model with the help of Example;

Q2 a) Explain the significance of hidden layer. How it is useful in pattern recognition and control Problem? **(6)**

b) Describe McCulloch-Pitts Neuron. Implement "AND" Function using McCulloch-Pitts Neuron. **(6.5)**

Q3 a) What are activation Function? What is the necessity of activation Function? Differentiate between Binary Sigmodial and Bipolar Sigmodial Function. **(6)**

b) Draw and explain discrete Hopfield network architecture and also state the testing algorithm used in discrete Hopfield network? **(3.5+3=6.5)**

Q4 a) What are Fuzzy Set? Enlist and explain various operations on Fuzzy Set. What do you mean by Lambda-Cut? **(6)**

b) With the suitable example, explain how membership assignment is performed using intuition and genetic algorithm? **(6.5)**

Q5 a) Find the weight required to perform the following classification using perception network. The vectors (1,1,1,1) and (-1,1,-1,-1) are belonging to the class (so have target value 1), vectors (1,1,1,-1) and (1,-1,-1,1) are not belonging to the class (so have target value -1). Assume learning rate as 1 and initial weight as 0. **(6)**

b) With a suitable case study, demonstrate the canonical rule formation, aggregation of the Fuzzy rules and decomposition of the compound rule formed. **(6.5)**

P.T.O.

Q6 a) Define defuzzification. What are the different methods of defuzzification? Which of these techniques of defuzzification is best? **(1+4.5+2)**

b) Compare and contrast multi-objective decision making and multi-attribute decision making. **(5)**

Q7 a) Explain the associative memory and its functioning using neat diagram. **(6)**

b) Explain following terms associated with associative memory: **(6.5)**

i) Association
ii) Heteroassociation
iii) Learning
iv) Retrieval
v) Reliability of the answer

Q8 a) Explain with the help of neat diagram the architecture of neuro-fuzzy network. Also explain its application in medicine and economics. **(4.5+2+2)**

b) Explain the operation of genetic programming a neat flowchart. How Mutation, Selection and Crossover works in genetic algorithms? **(4)**

Q9 Write short note on **(3+3+3+3.5)**

a) Linguistic variables.
b) Applications of ANN.
c) Fitness Function.
d) Kohonen Self-Organising Feature Maps.

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