Sub Code:NOE031

Paper Id: 199321 Roll No: | | | | | | | | | | | | | |

B TECH
(SEM-III) THEORY EXAMINATION 2019-20
INTRODUCTION TO SOFT COMPUTING
(NEURAL NETWORKS, FUZZY LOGIC AND GENETIC ALGORITHM)

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. Artificial Intelligence can be used in Neural Network or not. Justify your answer.
b. Define Associative Memory and Write down its applications.
c. Draw fuzzy membership function to describe cold, warm and hot water.
d. Explain Roulette Wheel Selection in genetic algorithms.
e. Define learning. Discuss the different learning methods in brief.
f. Why Neural Networks is also called as Parallel Distributed Processing?
g. Define Gradient descent learning.
h. How to define power of fuzzy sets?
i. What is Soft computing? How is it different from conventional computing?
j. What is significance of Recurrent networks?

SECTION B

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

a. Explain how multilayer feed forward neural network can be used for character recognition. Use a sample of 7*10-pixel matrix for the recognition of letter 'A'.
b. Implement a MADLINE network to solve the XOR problem.
c. Explain the effect of selection, crossover and mutation in evolutionary computation. How is the population affected by the use of each one of these operators? What happens if you use a relatively high rate of mutation?
d. Let sets of values of variables X and Y be X= $\{x_1,x_2,x_3\}$and Y=$\{y_1,y_2\}$, respectively Assume that a proposition "if X is A, Then Y is B" is given, where A=$.5/x_1+1/x_2+.6/x_3$ and B=$1/y_1+.4/y_2$. Then, given a fact expressed by the proposition "X is A", where A'=$.6/x_1+.9/x_2+.7/x_3$. Use the generalized modus pones to desire a conclusion in the form "Y is B".
e. What are the characteristics of Neural Networks? Explain three fundamentally different classes of Networks.

Paper Id: 199321 Roll No: | | | | | | | | | | | | | |

SECTION C

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

(a) Explain McCulloch-Pitts Neuron model and write disadvantage of it.
(b) What is the difference between crisp set and fuzzy set?

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

(a) Explain the Multiple Training Encoding Strategy.
(b) What is Back propagation error? Mention the heuristics which will significantly improve the performance of Back Propagation algorithm.

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

(a) Define membership function in detail. Also define its role and application.
(b) What is Fuzzy Quantifiers? Discuss in detail. Differentiate between Absolute and Relative Quantifier. Also define Fuzzification.

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

(a) Let A and B be two fuzzy sets given by A={(xl, 0.2), (x2,0.5), (x3, 0.6)}; B = {(x1, 0.1), (x2,0.4), (x3,0.5)}. Find $(A-B)^2$.
(b) Define a membership function for old people and generate a fuzzy set using this function.

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

(a) How genetic algorithms perform better result as compared to traditional approaches?
(b) How can Fitness functions be found for any optimization problem? Explain, in detail, Fitness Function in Genetic algorithm.