No. of Printed Pages : **2**

Sl. No.

C9-R4 : SOFT COMPUTING

NOTE :
1. **Answer question 1 and any FOUR from questions 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time : 3 Hours **Total Marks : 100**

1. (a) Define Support, core, crossover points and convex fuzzy sets.

(b) What are the objectives of soft computing ? Briefly mention some application areas of soft computing.

(c) State difference between derivative based and derivative free optimization techniques.

(d) What are the features of hybrid system ? Why it is required ?

(e) Differentiate between supervised learning and unsupervised learning.

(f) Determine (alpha) α - level sets and strong α - level sets for the following fuzzy set.

A= {(1, 0.2), (2, 0.5), (3, 0.8), (4, 1), (5, 0.7), (6, 0.3)}

(g) How overfitting may affect the result in machine learning ? **(7x4)**

2. (a) Explain Error Back Propagation training algorithm with flow chart.

(b) What are the steps in genetic algorithms ? Explain with examples the uniform crossover, tournament selection and mutation. **(9+9)**

3. (a) Explain the characteristics and properties of hybrid fuzzy neural network.

(b) Explain any five defuzzification methods with suitable examples. **(8+10)**

4. (a) What are the different steps for system identification ? Explain.

(b) What are the characteristics of Hybrid Soft Computing ? Discuss in brief.

(c) How genetic algorithms perform better as compares to traditional approaches ? **(6+6+6)**

5. (a) Discuss advantages, disadvantages and applications of neuro-fuzzy and neuro-genetic hybrid systems.

(b) Explain various type of encoding used in genetic algorithm. **(9+9)**

6. (a) How can Fitness functions be found for any optimization problem ? Explain, in detail, Fitness Function in Genetic algorithm.

(b) Explain inverse learning for designing neuro-Fuzzy Controller.

(c) Draw the architecture of fuzzy back Propagation network for neural network.

(6+8+4)

7. (a) What do you understand by Regression Analysis ? Explain least square method for Regression Analysis.

(b) Enumerate the advantages and disadvantages of the three major optimization algorithms: gradient descent technique, Newton based technique and genetic algorithms.

(c) Differentiate between classical sets and fuzzy sets. **(8+6+4)**

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