

## 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) Briefly mention the constituents of Soft Computing.
- b) List out at least four application domains of Neuro-Fuzzy Hybrid system.
- c) Draw the architecture of fuzzy back Propagation network for neural network.
- d) What are the termination criteria for any optimization techniques of soft computing?
- e) "Genetic Algorithm always performs better" Justify.
- f) "Neural Network always learns faster than other Classifier" Justify.
- g) How can genetic algorithm solve the weight determination problem of neural Network?

(7x4)

2.

- a) How can genetic algorithm be controlled by Fuzzy Logic?
- b) Explain Reinforcement Learning control with respect to Neuro-Fuzzy Control System.
- c) Is it possible to solve Travelling Sales Man Problem using Genetic Algorithm? How? Write the steps in brief.
- d) Define the following terms: Crisp Logic, Fuzzy Logic and Rough Logic

(5+5+4+4)

3.

- a) How can Fitness functions be found for any optimization problem? Explain Fitness Function in Genetic algorithm in details.
- b) How does learning rate play an important role in learning? How can the training of neural network be improved?
- c) Define: Momentum Coefficient, Sigmoidal Gain, Local Minima.
- d) Why Population is required? Which operator is applied first to the population?

(6+5+3+4)

4.

- a) How does specialized learning improve the learning process of Hybrid approach?
- b) How can Neuro-fuzzy modeling approach are applied to any optimization problem.
- c) How genetic algorithms perform better result as compared to traditional approaches?
- d) Discuss the framework of Adaptive Neuro Fuzzy Inference System (ANFIS)?

(6+4+5+3)

5.

- a) While training, explain how generational Cycle works with Genetic algorithm? Discuss briefly.
- b) For optimization problem write hybridization steps of "Genetic-Fuzzy-Neural Network".
- c) "Inversion and deletion can't improve the performance." Justify.
- d) Discuss the relationship between bias and variance dilemma.

(4+6+4+4)

6.

- a) Differentiate between Competitive learning and supervised Learning?
- b) List the various methods to generate offsprings while using genetic algorithm.
- c) What is Optimization and Optimized solution? Briefly discuss derivative Based Optimization?
- d) List the types of hybrid system and its application domain where hybrid system are used.

**(4+4+6+4)**

7.

- a) What should be the crossover rate and mutation rate for the optimization problem?
- b) How does universal approximation play an important role in hybrid approach of soft computing?
- c) Is back propagation required? How does Back Propagation give the performance through Time?
- d) What are the objectives of soft computing? Briefly mention the application area of soft Computing?

**(4+6+4+4)**