Ref. No. : EX/PG/CSE/T/128C/2018

MASTER OF COMPUTER SCIENCE & ENGINEERING 2nd SEMESTER EXAMINATION 2018

SOFT COMPUTING

Time: Three Hours Full Marks: 100

Answer any Five Questions

1. a) What is "Soft Computing"? Why is it named so? --- Explain your answer with suitable example. (4+4)

   b) Discuss the role of each of the major computing methodologies of soft computing. (6)

   c) To achieve human-like behaviour, what are the characteristics that a system model should possess? (4)

   d) Discuss on "Soft Computing Data". (2)

2. a) What is a perceptron? (4)

   b) Design a layered neural network for generating a triangular (convex) decision region. (6)

   c) What is an activation function? Discuss on the criteria for selecting suitable activation function. (5)

   d) What are the differences between supervised and unsupervised neural networks? - Discuss. (5)

3. a) Describe the characteristics of Multi Layer Perceptron (MLP)? Discuss on the significance of bias and learning rate used in MLP. (4+4)

   b) Discuss on the disadvantages of Backpropagation learning algorithm and its possible remedies. (6)

   c) How does the performance of an MLP vary with the variation of the following factors? (6)

      i) Percentage of training data

      ii) Percentage of test data

      iii) Number of neurons in each hidden layer

      iv) Number of hidden layers

4. a) Write down the characteristics of Kohonen's Self Organizing Feature Map (SOFM) Neural Network. Describe its working principle. How does "Self organization" occur? How does this neural network cluster a data set? (2+4+2+6)

b) Describe the architecture of Hopfield's model of neural network. (6)

5. a) Write down the major functional differences among various types of Evolutionary Computing Techniques. (4)

b) What will be the impact on performance of GA, if no crossover operator is used? (4)

c) How can you control the resolution of a solution in GA? Give suitable example in support of your answer. (6)

d) Write down the distinguishing characteristics of GA. (4)

e) What is elitism? (2)

6. Discuss on i) handling of infeasible solutions, ii) encoding of solution, iii) fitness function, and iv) genetic operators used for each of the following applications:

a) Application of GA for Clustering.

b) Application of GA for Travelling Salesman problem. (10+10)

7. a) Define Fuzzy set. Compare fuzzy set and crisp set. (2+4)

b) Discuss on various types of cardinality associated with fuzzy set. (6)

c) Give two real life examples of fuzzy modifier. (4)

d) Why does "Law of Contradiction" not hold good for fuzzy set. (4)

8. a) Describe on the four frequently used S-norm operators. (6)

b) What is fuzzy relation matrix? What is a fuzzy graph? What is alpha-cut of fuzzy graph? (6)

c) Three elements for a medicinal research are defined as:

D= 0.3/0 + 0.7/1 + 1/2

I = 0.5/20 + 0.75/30 + 0.6/40

V = 0.7/20 + 0.8/30 + 0.5/40

Find (i) R = D x I (ii) max-min composition of V o R (8)
