

Roll No

MCADD-801

M.C.A. (Integrated), VIII Semester

Examination, May 2019

Soft Computing

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) What is Soft Computing? Describe why soft computing is particularly useful in representing and reasoning with human oriented knowledge.
b) Differentiate the following:
 - i) Hopfield network and Kohonen's network
 - ii) Supervised and unsupervised learning
2. a) Derive the back propagation training algorithm for the neurons in the hidden layer using logistic function and the neurons in the output layer using linear functions.
b) Compare statistical and deterministic training method. Explain Boltzmann's machine. What are its limitations?
3. a) Explain the architecture of Adaptive Resonance Theory (ART) with the help of a schematic diagram.
b) What is Neural Network? Briefly describe any five learning methods of Neural Networks.
4. a) Describe the importance of fuzzy sets. Explain in detail the properties of fuzzy sets.

- b) The task is to recognize English alphabetical characters (F, E, X, Y, I, T) in an image processing system. Define two fuzzy sets \bar{I} and \bar{F} to represent the identification of characters I and F.

$$\bar{I} = \{(F, 0.4), (E, 0.3), (X, 0.1), (Y, 0.1), (I, 0.9), (T, 0.8)\}$$

$$\bar{F} = \{(F, 0.99), (E, 0.8), (X, 0.1), (Y, 0.2), (I, 0.5), (T, 0.5)\}$$

Find the following.

i) $\bar{I} \cup \bar{F}$

ii) $(\bar{I} - \bar{F})$

iii) $F \cup \bar{F}^C$

5. a) Given two relations R and S be defined on the sets $\{1, 3, 5\} \times \{1, 3, 5\}$

Where $R : \{(x, y) / y = x + z\}$

$S : \{(x, y) / x < y\}$

Represent relation matrices and find the composition RoS.

- b) Using your own intuition and your own definitions from fuzzy relation? Explain various properties of crisp relation and fuzzy relation.

6. a) What are Genetic algorithms? Compare them with traditional optimization techniques.

- b) What are reproduction, crossover and mutation operators in GA? Explain. How do these genetic operators affect the performance of GA?

7. a) Define rough sets. What are their applications?

- b) Write a brief note on the integration of fuzzy systems, neural networks and genetic algorithm.

8. Write short notes on the following:

- Application of GA
- Optimization techniques
- ADALINE and MADALINE
- Stochastic neural networks