

INTEGRATED M.C.A. SEM – IX: WINTER · 2022
SUBJECT: SOFT COMPUTING

Day: Tuesday
 Date: 27-12-2022

Time: 10:00 AM TO 1:00 P.M.
 Max. Marks: 100

W-10102-2022

N.B.:

- 1) Attempt any **FOUR** questions from Section –I and any **TWO** questions from Section –II.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SAME** answer book.

SECTION-I

- Q.1** a) Explain different applications of neural network. (08)
 b) Describe rule induction with example. (07)
- Q.2** Explain single layer and multilayer feed forward network with suitable diagram. (15)
- Q.3** What are the genetic operators? Explain crossover and mutation operator with example. (15)
- Q.4** a) Explain different properties of fuzzy set. (07)
 b) Explain different fuzzy connectives. (08)
- Q.5** Explain different factors affecting back propagation training. (15)
- Q.6** Write short notes on: (15)
- a) Perceptron model
 - b) Fuzzy logic
 - c) Artificial neuron

SECTION-II

- Q.7** The task is to recognize English alphabetical characters (F, E, X, Y, I, T) in image processing system. The sets \tilde{I} and \tilde{F} are to represent the identification of characters I and F. (20)
- $\tilde{I} = \{ (F, 0.4), (E, 0.3), (X, 0.1), (Y, 0.1), (I, 0.9), (T, 0.8) \}$
 $\tilde{F} = \{ (F, 0.99), (E, 0.8), (X, 0.1), (Y, 0.2), (I, 0.5), (T, 0.5) \}$
- Find the following:
- a) $\tilde{I} \cup \tilde{F}$ b) $\tilde{I} - \tilde{F}$ c) $\tilde{F} \cup \tilde{F}^c$
- d) Verify DeMorgan's law: $(\tilde{I} \cup \tilde{F})^c = \tilde{I}^c \cap \tilde{F}^c$
- Q.8** Consider the fuzzy sets \tilde{A} and \tilde{B} defined on the interval $X = [0, 5]$ of real numbers by the membership grade functions. (20)
- $\mu_{\tilde{A}}(x) = \frac{x}{x+1}$ $\mu_{\tilde{B}}(x) = 2^{-x}$
- Determine the following:
- a) \tilde{A}^c b) \tilde{B}^c c) $\tilde{A} \cup \tilde{B}$ d) $\tilde{A} \cap \tilde{B}$
- (Hint: Compute membership set for values of x as 0, 1, 2, 3, 4, 5)
- Q.9** a) Describe genetic algorithm with flowchart. (10)
 b) Explain hetro associative memory mode. (10)