Total Pages—4

(Set-R_1)

B.Tech - 8th
Soft Computing

Full Marks : 70

Time : 3 hours

Q. No. 1 is compulsory and answer any five from the rest

The figures in the right-hand margin indicate marks

1. Answer *all* questions : 2 × 10

   (*a*) What is the difference between the classic proposition and fuzzy proposition ?

   (*b*) State the taxonomy of the crossover operator.

   (*c*) What are the different activation functions used and different learning rules available ?

   (*d*) For the fuzzy representation below, find

$M_1 \cdot M_2$ and explain the significance in the real world.

$$M_1 = \begin{bmatrix} 1 & 0{\cdot}2 & 0 \\ 0 & 0{\cdot}6 & 0{\cdot}3 \\ 0{\cdot}7 & 0 & 0{\cdot}1 \end{bmatrix} \qquad M_2 = \begin{bmatrix} 0{\cdot}2 & 0{\cdot}2 & 0 \\ 0 & 0{\cdot}2 & 1 \\ 0 & 0 & 0{\cdot}7 \end{bmatrix}$$

(*e*) Write the equation for perceptron and explain the significance of this equation.

(*f*) How is fuzzy relation converted into a crisp relation using lamda-cut process ?

(*g*) State the importance of simulated annealing.

(*h*) Write any one equation of the kernel function and explain the terms.

(*i*) Distinguish between Madaiine and Adaline.

(*j*) Give an example on extension principle.

2. (*a*) Explain the issues when designing a genetic algorithm for intelligent internet search. 5

(*b*) Explain the downhill simplex search method with example. 5

3. Explain the fuzzy relations and fuzzy rules with suitable illustration. 10

4. Describe the following terms in Genetic Algorithm : 2×5

   (*a*) Crossover rate

   (*b*) Mutation

   (*c*) Reproduction

   (*d*) Roulette wheel selection

   (*e*) Fitness function.

5. (*a*) Why do we need to calculate the gradient in the back propagation algorithm ? In a feed forward neural network trained by back propagation, what is back propagated and from where to where ? Explain with the help of the diagram mathematically. 7

(*b*) What role does the steepness function in this learning process ? 3

6. (*a*) Discuss different defuzzification methods (any four). 5

(*b*) Explain SUGENO model of fuzzy interface systems. 5

7. (*a*) Are there any relation between the number of neurons and the types of classification ? Explain. 5

(*b*) What are the advantages and disadvantages of neural network classification schemes ? Which type of problems neural network is not suited for ? 5

8. Write short notes on : 5×2

(*i*) ANFIS

(*ii*) Different structures for fuzzy if-then rule.
