B.E. Information Technology Eighth Semester

IT 802 - Soft Computing Techniques

P. Pages : 2 **GUG/W/18/2048**

Time : Three Hours * 1 5 6 5 * Max. Marks : 80

Notes : 1. Same answer book must be used for all section.
2. All questions carry marks as indicated.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.
5. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) What is the difference between soft computing and hard computing. Explain with suitable example. **5**

b) Write the difference between biological neuron and Artificial neuron. **5**

c) Write Advantages of neural network write Applications of neural network. **6**

OR

2. a) Explain single layer and multilayer neural network with suitable diagram. **6**

b) What do you mean by neural network learning. What are different learning algorithm explain each one in brief. **10**

3. a) What are different activation function give at least 4 activation function with suitable equation & figure. **8**

b) Write a short note on **8**
i) Weight ii) Bias
iii) Learning note iv) Threshold.

OR

4. a) Implement NAND function using perceptron network for bipolar input and targets. **10**

b) What is Adaline network with the step for training/learning algorithm. **6**

5. a) Discuss the selection operation in genetic Algorithm. What are different techniques are used for selection write in detail. **8**

b) Write a note on Roulette wheel used in G.A. for evaluation of fitness. **8**

OR

6. a) What do you mean by crossover? Why it is done and what are its different methods. Discuss single point, and multipoint crossover with suitable example and diagram. **10**

b) Write a short note on matrix crossover. **6**

7. a) Write a detail note on mutation and its operators. **8**

b) Given two fuzzy sets. **8**

$x = \{(x_1, 0.3), (x_2, 0.4)\ (x_3, 0.5)\ (x_4, 0.6)\}$

$y = \{(x_1, 0.7), (x_2, 0.5), (x_3, 0.2), (x_4, 0.8)\}$

Find the following.

1) $x \cap y$ 2) $\bar{x} \cup y$

3) $\bar{y}$ 4) $x | y$

5) $\overline{x \cup y}$ 6) $x \cap \bar{y}$

7) $\bar{x} | y$ 8) $\bar{x}$

OR

8. a) Find the relation between R_1 and R_2 using following composition. **10**

$$R_1 = \begin{array}{c} \\ x_1 \\ x_2 \end{array} \begin{array}{c} \begin{array}{cccc} y_1 & y_2 & y_3 & y_4 \end{array} \\ \begin{bmatrix} 0.3 & 0.1 & 0.6 & 0.3 \\ 0.1 & 1 & 0.2 & 0.1 \end{bmatrix} \end{array}$$

$$R_2 = \begin{array}{c} \\ y_1 \\ y_2 \\ y_3 \\ y_4 \end{array} \begin{array}{c} \begin{array}{ccc} z_1 & z_2 & z_3 \end{array} \\ \begin{bmatrix} 0.9 & 0.1 & 1 \\ 0.1 & 0.5 & 0.4 \\ 0.6 & 0.8 & 0.5 \\ 0.1 & 0 & 0 \end{bmatrix} \end{array}$$

i) Max-min composition

ii) Max product composition.

iii) Max Average composition.

b) Write a note on **6**

i) Membership function.

ii) Fuzzification

9. a) What are angular fuzzy sets compare it with other fuzzy sets. **10**

Using inference approach find the membership values for each of the triangular shapes I, R, E, IR, T given below

a) $20^o, 40^o, 120^o$ b) $85^o, 55^o, 40^o$

b) Explain Hybrid system and its types Discuss its advantages and disadvantages. **6**

OR

10. a) Explain fuzzy back propagation network its architecture, learning algorithm and inference. **10**

b) What is knowledge base evaluation explain it with suitable example. **6**

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