B.E (IT) Sem VIII CBGS

Soft computing

12/5/24

Q.P. Code : 720801

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question no. 1 is compulsory.
(2) Solve any Three questions out of remaining Five questions.

1 a) Give the application scope of Neural Networks. **5**
b) What is activation function? Discuss the role of Sigmoidal activation function in backpropagation. **5**
c) Define soft computing. Distinguish between soft computing and hard computing? **5**
d) Explain in short the membership functions in Fuzzy Set. **5**

2 a) Explain in detail the back-propagation algorithm. **10**
b) Discuss fuzzy composition techniques with suitable example. **10**

3 a) Explain in detail the Genetic Algorithm based backpropagation network. **10**
b) Two fuzzy relations are given by **10**

$$R = \begin{array}{c} \\ x_1 \\ x_2 \end{array} \begin{array}{c} \begin{array}{cc} y_1 & y_2 \end{array} \\ \begin{bmatrix} 0.6 & 0.3 \\ 0.2 & 0.9 \end{bmatrix} \end{array}$$

$$S = \begin{array}{c} \\ y_1 \\ y_2 \end{array} \begin{array}{c} \begin{array}{ccc} z_1 & z_2 & z_3 \end{array} \\ \begin{bmatrix} 1 & 0.5 & 0.3 \\ 0.8 & 0.4 & 0.7 \end{bmatrix} \end{array}$$

Obtain fuzzy relation T as a max-min composition and max-product composition between the fuzzy relations.

4 a) What is linear Separability? Justify-XOR function is non-linearly separable by a single decision boundafy line. **10**
b) Describe in detail the formation of inference rules in a Mamdani Fuzzy Inference System. **10**

5 a) State and justify the role of vigilance parameter in ART network. **10**
b) Implement OR function using perceptron networks for bipolar inputs and targets. **10**

6 a) Write short note on Defuzzification. **5**
b) Write short note on Delta Learning Rule. **5**
c) Explain applications of Hybrid Systems. **5**
d) Explain in short Radial Basis Function Network **5**