



Question bank SC

Chapter1:Fuzzy Set Theory

1. Difference between Classical sets and Fuzzy sets.
2. State the relation between AI and SC and their Growth.
3. Different ways to represent a Fuzzy set.
4. Fuzzy set operations.(Any 8 formulae with numericals)
5. Consider a fuzzy set and use Zadeh's notation to represent the Fuzzy set. $X = \{a, b, c, d, e, f\}$. Infer lambda cut and strong lambda cut for 0.9 and 0.3.
6. Representation of Fuzzy Relations and calculating cardinality of Fuzzy Relations.
7. Properties of Fuzzy Relations.
8. Explain the features of Membership function.
9. Different types of composition on Fuzzy Relations.(Short Note)
10. Numericals on max-min and max-product composition on Fuzzy Relations.
11. Explain different defuzzification techniques.(Please do numericals done in the lecture)

Chapter 2:Fuzzy Rules,Reasoning and Inference Systems

1. Short note on Fuzzy Rules.(IF-THEN)
2. Write a short note on Fuzzy Implication Rule.
3. Explain Zadeh and Mamdani interpretation of Fuzzy Rule.
4. Architecture of Fuzzy Inference system along with explanation of each block.
5. Difference between Mamdani and Sugeno FIS.
6. Designing FIS for washing machine.

Chapter 3Neural Network-I

1. Explain Mc.Culloch Pitts Neuron with example.
2. State various applications of NN.
3. What is NN architecture? Explain logistic sigmoid function with example.
4. What is ANN? Define characteristics and applications of ANN.
5. Determine the weights after one iteration for Hebbian learning of a single neuron network starting with initial weights $w = [1 \ -1]$. The inputs are $X_1 = [1 \ -2]$, $X_2 = [2, 3]$, $X_3 = [1, -1]$ and learning rate $c=1$. Use Bipolar Binary activation function, Use Bipolar continuous activation function.
6. A single-layer neural network has the weights $w = [0.2 \ 0.5 \ 0.66 \ 0.45]$ with bias $b=0.3$. It is given an input of $I = [0.5 \ 0.8 \ 0.1 \ 0.36]$. Find/estimate the output if the sigmoidal activation function is used (slope = 0.3).
7. Explain single layer NN architecture using Perceptron model with suitable activation function.
8. Give weight matrix of Mc.Culloch Pitts Neuron model for binary AND/OR function
9. What is Linear Separability? Explain with example why single layer perceptron is not capable of solving Linearly inseparable problems.
10. Explain with diagram supervised and unsupervised learning in NN.
11. Explain different activation functions in NN.



12. Design Heb Net to implement logical AND/OR function. Use bipolar inputs and targets.
13. Explain Perceptron Convergence theorem.
14. Write a short note on Delta Learning Rule (Numerical to be solved)
15. What are the different types of ANN? Explain any two with diagram.
16. Write a short on learning techniques used in ANN (Hebb learning, Memory Based learning, Boltzmann learning, Competitive learning).

Chapter 4: Neural Networks-II

1. Architecture of Multilayer FeedForward Network.
2. Explain Back Propagation algorithm with flowchart.
3. Numerical on Back Propagation Network.
4. Solving XOR problem using Back Propagation algorithm.
5. Write a short note on Character Recognition.
6. Explain different terminologies used in Character Recognition: Binarization, Preprocessing, Filters, Smoothing, Skew Detection and Correction, Slant Correction, Character Normalization, Thinning, Segmentation.
7. Explain the architecture of ART-I along with suitable diagram.
8. Explain ART-I with example.

Chapter 5: Genetic Algorithm

1. How do genetic Algorithms differ from conventional optimization algorithms?
2. Demonstrate/outline the working of Roulette-wheel selection.
3. Describe Genetic Algorithms considering: Encoding, Selection, Crossover, Mutation, and Stopping Condition for Genetic Algorithms.
4. List the variety of Genetic algorithm. Explain Hybrid GA.
5. Explain with example different operators involved in simple GA.
6. List the different functions of Selection Operator. List different techniques to implement selection in GA.
7. State the classification of GA and explain in detail the concept "Problem Solving using GA".
8. Write a short note on schema theorem.
9. Write a short note on gradient descent optimization.

Chapter 6 Hybrid Systems

1. Compare and contrast ANN, Fuzzy logic and GA.
2. What are Neuro-Fuzzy Systems? Explain different steps in Neuro-Fuzzy Hybrid System.
3. Explain different types of Hybrid Systems.
4. State the advantages and disadvantages of Hybrid Systems.
5. State different applications of Hybrid Systems.
6. Compare and contrast: Mamdani and Sugeno Hybrid Systems.
7. Write a short note on GA-Fuzzy approach.
8. Sketch the 5 layer ANFIS mentioning the task of each layer.