



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**

**PUTTUR (AUTONOMOUS)**

Siddharth Nagar, Narayanavanam Road – 517583

**QUESTION BANK (DESCRIPTIVE)**

**Subject with Code : SCT (16EE237)**

**Course & Branch: B.Tech - EEE**

**Year & Sem: IV-B.Tech & II-Sem**

**Regulation: R16**

**UNIT-I**

**FUNDAMENTALS OF ARTIFICIAL NEURAL NETWORKS**

1. a) Explain characteristics of Artificial neural network. [CO2][L1] [6M]  
b) What is generalization? Explain. [CO2][L2] [6M]
2. List out the applications of neural networks and Explain. [CO2][L2] [12M]
3. a) List out the different activation functions used in neural networks. [CO2][L1][6M]  
b) Why thresholding function is not used as activation function in Multi-Layer Feed Forward Networks. [CO2][L3][6M]
4. Explain types of activation function & Explain Neural dynamics.[CO2] [L2] [12M]
5. a) Explain organization of human brain. [CO1][L1] [6M]  
b) Discuss the functioning of biological neuron. [CO1][L2][6M]
6. Discuss the applications of ANN. [CO2][L2] [12M]
7. Discuss activation function dynamics. [CO2][L2] [12M]
- 8.a) Implement a perceptron to solve simple AND problem with two inputs.[CO2][L3] [6M]  
b) Try to implement XOR problem with two inputs and discuss on it. [CO2][L4] [6M]
- 9 (a) How artificial neuron is inspired from the biological neuron? Explain. [CO1] [L2] [6M]  
(b) Explain the basic architecture of McCulloch – Pitts neuron model and also realize 3-input NAND gate using McCulloch – Pitts model. [CO1] [6M] [L3]
- 10.Explain the functioning of Rosenblatt perceptron.[CO2] [L2][12M]

**UNIT-II**

**SUPERVISED, UNSUPERVISED NETWORKS**

- 1.Explain supervised learning in detail with block diagram . [CO2][L2] [12M]
2. Give the perceptron weight updating rule and the learning algorithm.[CO2] [L3] [12M]
3. (a) Explain why single layer perceptron network couldn't solve even EX-OR problem. [CO2][L3] [6M]  
(b) Derive the equation for weight change for discrete perceptron network. [CO2][L3] [6M]
4. Explain input layer, hidden layer & output layer computations in multi layer feed forward networks. [CO2] [L2] [12M]
5. a) Explain how supervised learning happens in neural networks. [CO2] [L2] [6M]  
b) Explain back propagation learning. [CO2] [L3][6M]
6. Explain the weight adjustment procedure in MLFFN using back propagation algorithm. [CO2] [L3][12M]
7. Explain ANN approach to load forecasting problem. [CO3] [L5] [12M]
8. Discuss credit assignment problem in Multi Layer Feed forward networks. [CO2] [L5] [12M]
9. a) What are the different learning parameters in back propagation? [CO2] [L1][6M]  
b) Explain how they influence the learning. [CO2] [L2][6M]

10. a) How the hidden layer neurons influence representation of neural network? [L3][6M]  
 b) Explain how to choose number of hidden layer neurons. [CO2] [L3][6M]

**UNIT-III**  
**ASSOCIATIVE MEMORIES**

1. What is associative memory? Explain briefly [CO2] [L2] [12M]
2. Briefly explain the working principle of hetero correlators. [CO2] [L2] [12M]
3. Briefly explain the working principle of Hopfield network. [CO2] [L2] [12M]
4. Explain storage and recall phase in Auto associative memory. [CO2] [L2][12M]
5. Explain the working principle of BAM. [CO2] [L2] [12M]
6. Distinguish Auto associative & Hetero associative memories. [L2] [12M]
7. a) What is hamming distance? [CO2] [L2][3M]  
 b) Explain how Associative memories work based on hamming distance. [CO2][L3][9M]
8. Explain Energy function in BAM and its importance. [CO2] [L3] [12M]
- 6 (a) Explain in detail recurrent associative memory. [CO2] [L3][6M]  
 (b) Construct a BAM with 4 nodes in the first layer and 2 nodes in the second layer and symmetric weights. Establish the following three associations. [CO2] [L3] [6M]  
 $(+1, +1, -1, -1) \rightarrow (+1, +1)$   
 $(+1, +1, +1, +1) \rightarrow (+1, -1)$   
 $(-1, -1, +1, +1) \rightarrow (-1, +1)$
9. Explain how noisy patterns are recognized in auto associative memory with an example. [CO2] [L4] [12M]
10. Explain how pattern pair is recalled in BAM with an example. [CO2] [L2] [12M]

**UNIT-IV**  
**CLASSICAL AND FUZZY SETS**

1. Compare and contrast Fuzzy vs Crisp [CO4] [L2] [12M]
2. a) Explain Operations performed on crisp sets. [CO4] [L1] [6M]  
 b) Give the properties of crisp sets. [CO4] [L1] [6M]
3. a) Explain operations performed on fuzzy sets. [CO4] [L2] [6M]  
 b) Give the properties of fuzzy sets. [CO4] [L1] [6M]
4. a) Explain Cartesian product on fuzzy sets. [CO4] [L2] [6M]  
 b) Discuss how fuzzy relations are formed based on Cartesian product. [CO4] [L2] [6M]
- 5 (a) Consider set  $X = \{2, 4, 6, 8, 10\}$  then find its power set, cardinality and cardinality of power set. [CO4] [L3][6M]  
 (b) Explain the operations and properties over a fuzzy relation. [CO4] [L2] [6M]
- 6 Consider two fuzzy subsets of the set  $X, X = \{a, b, c, d, e\}$  referred to as A and B.  
 $A = \{1/a, 0.3/b, 0.2/c, 0.8/d, 0/e\}$  and  $B = \{0.6/a, 0.9/b, 0.1/c, 0.3/d, 0.2/e\}$   
 Find: (i) Complement. (ii) Union. (iii) Intersection iv) Difference [CO4][L3][12M]
7. a) Define membership function. [CO4] [6M] [L1]  
 b) Give various ways of allotting membership functions for fuzzy sets. [CO4] [L2] [6M]
8. Explain Composition operation performed on fuzzy relation with example. [CO4] [L2] [12M]
9. Explain fuzzy inference using Modus ponens and Modus tollens. [CO4] [L2] [12M]
10. a) What is fuzzy logic? [CO4] [L3] [6M]  
 b) What are the sources fuzzy information? and explain each. [CO4][L2][6M]
11. a) Explain the operation of fuzzy sets. [CO4][L2][6M]  
 b) For the following fuzzy relations, perform the MIN – MAX composition. [CO4][L3][6M]

$$R1 = \begin{bmatrix} 1 & 0.4 & 0.1 \\ 0.2 & 0.6 & 0.8 \\ 0.1 & 0.4 & 0.8 \\ 0.9 & 0.3 & 0 \end{bmatrix} \quad R2 = \begin{bmatrix} 0.1 & 0.2 & 0.4 & 0.9 \\ 1 & 0.1 & 0.7 & 1 \\ 0.8 & 0.7 & 0.1 & 0.5 \end{bmatrix}$$

**UNIT-V**  
**FUZZY LOGIC SYSTEMS**

1. Explain the process of fuzzification in fuzzy logic. [CO4] [L3][12M]
2. Explain fuzzy rule based system in fuzzy logic. [CO4] [L3] [12M]
3. Explain importance of defuzzification in fuzzy logic. [CO4] [L3] [12M]
4. a) List out different defuzzification methods available. [CO4] [L1] [12M]  
b) Explain any one of the defuzzification method. [CO4] [L2][12M]
5. Explain Centre of gravity defuzzification method with an example. [CO4] [L2][12M]
6. Explain Centre of Sums defuzzification method with an example. [[CO4] L2][12M]
7. Explain Mean of Maxima defuzzification method with an example. [CO4] [L2] [12M]
8. Discuss any one fuzzy logic application in electrical engineering. [CO5][L5][12M]
9. Explain working Greg Viot's Fuzzy Cruise controller. [CO5][L3][12M]
10. Explain working of Air Conditioner with Fuzzy Logic. [CO5][ [L5][12M]