Printed Pages : 2 **Roll No.** | | | | | | | | | | | **NEE013**

B.TECH.

THEORY EXAMINATION (SEM–VI) 2016-17

NEURAL NETWORKS AND FUZZY SYSTEM

Time : 3 Hours ***Max. Marks : 100***

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1. Attempt the following: **10 x 2 = 20**

(a) What is the use of bias weight in artificial neuron ?

(b) Give block diagram for structural organization of biological neural system.

(c) Define Hebbian Learning Rule of Neural network.

(d) Compare between Auto associative memory and Hetro Associative Memory.

(e) How are Neural Networks related to machine learning?

(f) Consider the two given fuzzy sets :

A = { (2, 1) (4, 0.3) (6, 0.5) (8, 0.2)}

B = { (2, 0.5) (4, 0.4) (6, 0.1) (8,1)}

Find the Fuzzy intersection and Bounded Difference.

(g) Differentiate between Delta Rule & Gradient descent rule for learning.

(h) Compare ANN with conventional computing.

(i) What is learning? Differentiate between supervised and unsupervised learning.

(j) What is crisp relation? Differentiate between crisp and fuzzy logic.

SECTION – B

2 Attempt any five of the following questions: **5 x 10 = 50**

a) Give Back Propagation algorithm. Describe how error correction rule is applied? Describe the steps of training in BPN and changes in learning rate parameter.

b) What is Hebbian learning algorithm? Design a Hebb Net to implement logical AND function (consider bipolar input and output).

c) Explain the working of multilayer feed forward neural network with its architecture. How it is different from recurrent networks.

d) What is defuzzification? Explain Centroid method, weighted average method and Center of largest area method of defuzzification.

e) How is Inference performed in fuzzy logic? Draw the block diagram of Fuzzy Inference System and explain the complete process in detail.

f) What are linguistic variables and fuzzy modifiers? Let R is a relation between two fuzzy sets F and D, where F denotes set of fabrics and D is set of dirt.

F = {cotton, silk, nylon}, D= {less dirty, very dirty}. Define relation R in terms of amount of detergent used.

g) What are various learning techniques used in neural networks? Give the critical information used in the learning process? Also Explain how a momentum factor makes faster convergence of a network?

h) How do activation functions put affect on artificial neuron? Explain various activation functions.

SECTION – C

Attempt any two parts of the following questions: **2 x 15 = 30**

3 Write short notes on any three of the following:

(i) Linear Seperability in perceptron model
(ii) LR type fuzzy numbers
(iii) Max-min composition in fuzzy sets
(iv) Rosenblatt's Perceptron model
(v) Fuzzy Entropy Theorem

4 Explain various fuzzy set operations and properties of fuzzy sets.
A computer software is designed to perform image processing to locate objects within a scale. The two fuzzy sets P & T representing a plane and a train image are
P = {(train, 0.2), 9bile, 0.5), (boat, 0.3), (phone, 0.8), (house, 0.1)}
T = {(train, 1), (bike, 0.2), (boat, 0.4), (phone, 0.5), (house, 0.2)}

5 Give the architecture of fuzzy back propagation system. Explain learning and inference in fuzzy BP with suitable examples.