Exam.Code:0971
Sub. Code: 7400

2021

M.E. (Electronics and Communication Engineering)

Third Semester

ECE-1301: Neural Networks and Fuzzy Logic

Time allowed: 3 Hours Max. Marks: 50

***NOTE**: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Answer in brief:

a) Which activation functions are used for continuous applications?

b) List down any four applications of fuzzy logic.

c) Contrast artificial neural networks with conventional computer system.

d) What do you mean by 'weights' in artificial neural networks?

e) Differentiate between Fuzzy sets and classical sets.

f) List the merits and limitations of back-propagation training method.

g) If the value of membership function of "a" in set A is 0.8 what is the value of membership function of 'a' in set 'not A'.

h) List and draw any two commonly used membership functions for fuzzy sets.

i) Explain the concept of feedback in ANNs.

j) What are neuro-fuzzy systems? (10x1)

UNIT – I

II. a) Define learning and learning rules. Demonstrate with the help of an example the comparison between supervised and unsupervised learning. (4)

b) A single layer perceptron cannot solve XOR problem. Is the above statement True? Justify. (2)

c) Explain the practical considerations in implementing backpropagation algorithm? (4)

III. a) What are the shortcomings of the basic neuron model for ANNs? Discuss all models proposed thereafter to overcome these problems. (5)

b) Draw an Architecture of McCulloch-Pitts neuron. Realize the NOR function using McCulloch-Pitts neuron. (5)

P.T.O.

IV. a) What are Bidirectional Associative memories? Explain in detail with help of an appropriate example. (5)

b) Define and discuss the various activation functions used in neural networks. (5)

UNIT – II

V. a) Describe the design of fuzzy logic control for home heating.

b) What arc self-organizing maps. Explain Kohonen model & the three essential processes involved in the formation of Self Organizing Maps namely competition, co-operation and synaptic adaptation. (2x5)

VI. a) Discuss the different methods of defuzzification with an example. Which of these methods is the most accurate? Justify. (5)

b) Consider two fuzzy sets A and B defined in the universe (1,2,3,4,5] are given by:

$$A = \left\{\frac{1}{2} + \frac{0.5}{3} + \frac{0.3}{4} + \frac{0.2}{5}\right\} \text{ and } B = \left\{\frac{0.5}{2} + \frac{0.7}{3} + \frac{0.2}{4} + \frac{0.4}{5}\right\}$$

Find : i) $A \cup B$ ii) $A \cap B$ iii) A/B iv) $\overline{A \cup B}$ v) $\overline{B} \cap B$

(2x5)

VII. Write short notes on the following:-

a) Bidirectional Associative Memory

b) Hopfieled network (2x5)

x-x-x