Code No: R163202E **R16** SET - 1

III B. Tech II Semester Supplementary Examinations, February-2022

NEURAL NETWORKS AND FUZZY LOGIC

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A (14 Marks)

1. a) Write the applications of ANN? [2M]
   b) Explain why nonlinear functions are used as activation functions in artificial neural networks. [3M]
   c) What are the limitations of Hopfield network? [2M]
   d) Define Cardinality, Super set and Power set with examples. [3M]
   e) Discuss about Fuzzy If-Then Rule based system. [2M]
   f) What do you mean by fault diagnosis? [2M]

PART –B (56 Marks)

2. a) Discuss the McCulloch-Pitts model of an artificial neuron. [7M]
   b) Write historical developments in artificial neural networks. [7M]

3. a) Construct Artificial Neurons which can perform Logical AND, Logical OR operations (Prefer Two inputs only). [7M]
   b) List the classification of learning methods and explain any one method in detail. [7M]

4. a) Differentiate multilayer feed forward network and radial basis function network. [7M]
   b) Explain the concept of Energy function in BAM network along with architecture. [7M]

5. a) Explain Fuzzy vs Crisp set theory. [7M]
   b) Let X, Y, Z are three fuzzy sets defined on the universe of discourse $X = \{x_1, x_2, x_3, x_4\}$, $Y = \{y_1, y_2, y_3, y_4\}$ and $Z = \{z_1, z_2, z_3, z_4\}$. Fuzzy relation [7M]

$$\tilde{R} = \begin{bmatrix} 0.6 & 0.6 & 0.9 & 0.8 \\ 0.1 & 0.2 & 0.9 & 0.8 \\ 0.9 & 0.3 & 0.4 & 0.8 \\ 0.9 & 0.8 & 0.1 & 0.2 \end{bmatrix} \text{ and } \tilde{S} = \begin{bmatrix} 0.1 & 0.2 & 0.7 & 0.9 \\ 1 & 1 & 0.4 & 0.6 \\ 0 & 0 & 0.5 & 0.9 \\ 0.9 & 1 & 0.8 & 0.2 \end{bmatrix}$$

Find the Max-Min Composition.
~~~~~~

6. a) Discuss the fuzzy membership value assignment. [7M]
   b) Discuss briefly about various Defuzzification methods. [7M]

7. a) Define load forecasting. Explain load forecasting using artificial neural network with a neat sketch. [7M]
   b) Explain the concept of fuzzy classification. [7M]

*****