# 41821

May, 2019
**M.Tech. (CSE) - II SEMESTER (Reappear)**
**Soft Computing (MCSE -17-102)**

Time : 3 Hours]      [Max. Marks : 75

*Instructions :*

1.  It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.

2.  Answer any four questions from Part-B in detail.

3.  Different sub-parts of a question are to be attempted adjacent to each other.

## PART–A

1.  (a) Explain various types of architectures of ANN. (1.5)

    (b) Why do require an activation function of a neuron as differentiable. (1.5)

    (c) Why do we require soft computing techniques. (1.5)

    (d) What do you mean by discrete and continuous associative memory. (1.5)

    (e) What are different types of learning in ANN. (1.5)

(f) A fuzzy set is a super set of crisp set, explain. (1.5)

(g) Why do we devised extension principle. (1.5)

(h) How will you interpret a fuzzy rule. (1.5)

(i) What are fuzzy numbers. (1.5)

(j) What is lattice of fuzzy numbers. (1.5)

## PART–B

2. (a) Explain how a biological neuron is modelled as computational mechanism. (10)

(b) State Hebb's leaning rule and give learning algorithms for Hebb net. (5)

3. (a) Explain the architecture and the working of McCulloch Pitts Neuron net to implement the XOR operations. (5)

(b) Derive the derivation for a single neuron network Delta-Rule formula. (10)

4. (a) What are associative memories, give learning algorithm for Bi-directional Auto Associative Memory (BAM)? (7)

(b) Develop a perceptron model to implement an AND operation, where inputs and outputs are taken as bipolar binary values. (7)

5. (a) Consider the following fuzzy set A on
U = {a, b, c, d, e}
A = {0.2, 0.6, 0.8, 0.5. 0.9}
Find (i) Level set of A.
(ii) alpha-cuts of set A.
(iii) Fuzzy cardinality of A. (9)

(b) How can you synthesis a fuzzy set from a given set of crisp sets and corresponding alpha values? (6)

6. (a) Apply Max-Min Composition of R followed by S, where R and S are two fuzzy relations on U×V and V×W respectively.

$$R = \begin{pmatrix} 0.8 & 0.2 & 0.5 \\ 0.3 & 0.0 & 0.9 \\ 0.4 & 0.8 & 0.2 \end{pmatrix} \quad S = \begin{pmatrix} 0.5 & 0.1 \\ 0.6 & 0.9 \\ 0.4 & 0.4 \end{pmatrix}$$ (10)

(b) What are the linguistic variables, explain with help of an example? (5)

7. (a) Give algorithm for fuzzy inference mechanism. (8)

(b) Give various operation which you can perform on fuzzy numbers? (7)