M.Sc.(Electronics) CBCS Pattern Semester-III

PSELT302 - Core-X : Paper-II : Fuzzy Logic and Artificial Neural Networks

P. Pages : 2 **GUG/W/23/11253**

Time : Three Hours * 6 2 7 9 * Max. Marks : 80

Notes : 1. All questions are compulsory and carry equal marks.
2. Draw well labeled diagrams wherever necessary.
3. Use of calculator/ log table is allowed.

Either:

1. a) Explain the properties of fuzzy sets. **8**

b) Define the terms: **8**

i) Fuzzy relation.

ii) Fuzzy composition.

OR

c) Explain the λ - cut method for fuzzy sets. A fuzzy relation is given as, **8**

$$\underset{\sim}{R}(X,Y)=\begin{Bmatrix}1 & .2 & .3\\ .5 & .9 & .6\\ .4 & .8 & .7\end{Bmatrix}$$

Find the λ - cut relations for λ = 0.2, 0.5, 0.7, 0.9.

d) Explain Lambda cuts for fuzzy sets. **8**

Either:

2. a) Explain the extension principle with suitable examples. **8**

b) Explain the graphical techniques of inference with a suitable example. **8**

OR

c) Explain a method of fuzzy classification. Three data points the universe $X=\{X_1,X_2,X_3\}$ **8**
Show a fuzzy relation,

$$\underset{\sim}{R}=\begin{bmatrix}1 & .6 & .8\\ .6 & 1 & .6\\ .8 & .6 & 1\end{bmatrix}$$

Classify the data and draw the classification diagram.

d) Discuss the steps in the design of fuzzy system using nearest neighborhood clustering. **8**

Either:

3.	a)	Describe the architecture and derive the algorithm for a back propagation network.	**8**
	b)	List the five learning processes for the neural networks. Explain the Hebb's learning rule.	**8**

OR

	c)	Describe the memory- based learning rules.	**8**
	d)	Explain any one learning algorithm used for single layer feed forward neural network.	**8**

Either:

4.	a)	Explain the basic concepts and performance analysis of recurrent associative memory.	**8**
	b)	Explain bidirectional associative memory (BAM).	**8**

OR

	c)	Explain the architecture of recurrent auto associative memory (Hopfield Model).	**8**
	d)	Explain the salient features of a counter propagation network (CPN). List the applications of CPN.	**8**
5.	a)	Explain with examples the difference between crisp sets and fuzzy sets.	**4**
	b)	Explain the fuzzy logic for image processing.	**4**
	c)	What are the advantages of artificial neural network?	**4**
	d)	Distinguish between interpolative and accretive associative memories.	**4**

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