



Reg. No. : .....

Name : .....

**Eighth Semester B.Tech. Degree Examination, October 2014  
(2008 Scheme)**

**08.805 (1) : FUZZY SET THEORY AND APPLICATIONS (R)  
(Elective – III)**

Time: 3 Hours

Max. Marks: 100

**PART – A**

Short answer questions :

**(10×4=40 Marks)**

1. Explain properties of fuzzy set with example.
2. Explain the features of membership functions.
3. Define fuzzy Cartesian product.
4. Explain any three defuzzification methods.
5. Modify the preposition “x is young” in any three ways using Linguistic Hedges.
6. Write any four assumptions made in a Fuzzy Control System Design.
7. Explain the features of Fuzzy Neural Network.
8. Explain two basic methods of Fuzzy clustering.
9. Explain the role of Fuzzy set theory in Information Retrieval.
10. Describe cosine amplitude method.



## PART – B

Descriptive/Analytical/Problem Solving :

Answer **one** question out of **two** from **each** Module : (3×20=60 Marks)

## Module – 1

11. a) Given two fuzzy sets

$$\underline{D}_1 = \left\{ \frac{1}{1.0} + \frac{0.75}{1.5} + \frac{0.3}{2.0} + \frac{0.15}{2.5} + \frac{0}{3.0} \right\}$$

$$\underline{D}_2 = \left\{ \frac{1}{1.0} + \frac{0.6}{1.5} + \frac{0.2}{2.0} + \frac{0.1}{2.5} + \frac{0}{3.0} \right\}$$

Find (a)  $D_1 | D_2$  (b) Verify Demorgans Law.

b) Explain max-product method of composition of fuzzy relations. (15+5=20)

12. a) Check whether the following fuzzy relations is a fuzzy tolerance relation. If it is a fuzzy tolerance relation convert it into a fuzzy equivalence relation.

$$\begin{bmatrix} 1 & 0.8 & 0 & 0.1 & 0.2 \\ 0.8 & 1 & 0.4 & 0 & 0.9 \\ 0 & 0.4 & 1 & 0 & 0 \\ 0.1 & 0 & 0 & 1 & 0.5 \\ 0.2 & 0.9 & 0 & 0.5 & 1 \end{bmatrix}$$

b) Explain the properties of fuzzy sets. (15+5=20)

## Module – 2

13. a) Consider a fuzzy set defined on the universe  $X = \{a, b, c, d, e, f\}$

$$\underline{A} = \left\{ \frac{1}{a} + \frac{0.9}{b} + \frac{0.6}{c} + \frac{0.3}{d} + \frac{0.01}{e} + \frac{0}{f} \right\}$$

Find the  $\lambda$  cut sets  $A_\lambda$  for the values of  $\lambda = 1, 0.9, 0.6, 0.3$ .

b) Explain any two techniques for the decomposition of multiple antecedents into simple canonical forms. (10+10=20)



14. Let  $X = \{a, b, c, d\}$   $Y = \{1, 2, 3, 4\}$

$$\underline{A} = \left\{ \frac{0}{a} + \frac{0.8}{b} + \frac{0.6}{c} + \frac{1}{d} \right\}$$

$$\underline{B} = \left\{ \frac{0.2}{1} + \frac{1}{2} + \frac{0.8}{3} + \frac{0}{4} \right\}$$

$$\underline{C} = \left\{ \frac{0}{1} + \frac{0.4}{2} + \frac{1}{3} + \frac{0.8}{4} \right\}$$

Determine the implication relation.

- a) If  $x$  is in A then  $y$  is in B.
- b) If  $x$  is in A then  $y$  is in B else  $y$  is in C.

20

**Module – 3**

- 15. a) Give an example of a fuzzy control system.
- b) Explain nearest neighbour classifier and nearest centre classifier. (10+10=20)
- 16. a) Explain fuzzy clustering method for the partitioning of a collection of data.
- b) Explain a fuzzy neural network mode. (10+10=20)