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Reg. No. : | | | | | | | | | | |

Question Paper Code: 59223

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2019

Elective

Computer Science and Engineering

15UCS923- FUZZY LOGIC

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Where is the minimum criterion used? CO1-U

   (a) When there is an AND operation (b) When there is an OR operation

   (c) In De Morgan's theorem (d) None of the above

2. A relation R is defined on the set of positive integers as x Ry if $2x + y \leq 5$. The relation R is CO2- U

   (a) reflexive (b) transitive (c) symmetric (d) None of these

3. A fuzzy set whose membership function has at least one element x in the universe whose membership value is unity is called CO3-R

   (a) sub normal fuzzy sets (b) normal fuzzy set

   (c) convex fuzzy set (d) concave fuzzy set

4. In a Fuzzy set a prototypical element has a value CO4-U

   (a) 1 (b) 0 (c) infinite (d) Not defined

5. Fuzzy logic is a form of CO5- R

   (a) Two-valued logic (b) Crisp set logic

   (c) Many-valued logic (d) Binary set logic

PART – B (5 x 3= 15 Marks)

6.	How fuzzy sets are different from crisp set?		CO1-U
7.	For the given A = {1, 2}; B = {3, 4} Prove the Cartesian product is not associative		CO2-U
8.	What is fuzzy rule?		CO3-U
9.	How multi-objective is used in decision making?		CO4-U
10.	What is the reason that fuzzy logic function has rapidly become one of the most successful technologies for developing sophisticated control systems?		CO5-U

PART – C (5 x 16= 80 Marks)

11.	(a)	Define fuzzy set operation and properties. Draw the venn diagram for fuzzy set operation	CO1- App	(16)
		Or		
	(b)	Explain in details with example of properties of classical sets.	CO1-U	(16)
12.	(a)	Explain in detail about the crisp relation and compare with Fuzzy relation?	CO2-U	(16)
		Or		
	(b)	Assume the following universes: X = {x1, x2}, Y = {y1, y2}, and Z = {z1, z2, z3}, with the following fuzzy relations.	CO2-U	(16)

$$R = \begin{array}{c} \\ x_1 \\ x_2 \\ \\ \end{array} \begin{array}{c} \begin{array}{cc} y_1 & y_2 \end{array} \\ \begin{pmatrix} 0.7 & 0.5 \\ 0.8 & 0.4 \end{pmatrix} \\ \end{array} \quad \text{and} \quad S = \begin{array}{c} \\ y_1 \\ y_2 \\ \\ \end{array} \begin{array}{c} \begin{array}{ccc} z_1 & z_2 & z_3 \end{array} \\ \begin{pmatrix} 0.9 & 0.6 & 0.2 \\ 0.1 & 0.7 & 0.5 \end{pmatrix} \\ \end{array}$$

Find the fuzzy relation between X and Z using the max-min and max-product composition

13.	(a)	Explain defuzzification method in detail	CO3-U	(16)
		Or		
	(b)	Explain the features of membership function	CO3-U	(16)
14.	(a)	Discuss about decision making with fuzzy information using simple example.	CO4-U	(16)
		Or		
	(b)	Explain multi-objective decision making with example	CO4-U	(16)

15. (a) Explain the applications of fuzzy logic in medicine. CO5-U (16)

Or

(b) Write 3-5 fuzzy rules that determine heart attack risk, using: CO5- App (16)
Three ‘universes of discourse’ (UoD): diet, exercise, and risk
2 or 3 fuzzy classes per UoD, *and* their membership functions (represent graphically)
Show fuzzy inference for one set of sample data