PRN:		Course Code :	AMT1604

Third Year **B. Tech** End Semester Examination Summer 2024

Fuzzy Logic

Day and Date: 25 MAY 2024, Sat Max Marks: **100**

Time : 02:00PM To 05:00PM Duration: **03** hrs

Instructions: All questions are compulsory.

		Marks	Bloom's Level	CO
Q.1	**Attempt the following**			
a)	Explain classical sets.			
b)	Explain statistics & random processes.			
	OR			
c)	Define fuzzy set. Find $(i)P \cup Q$ $(ii)P \cap Q$ (			

$$P = \left\{\frac{0.4}{1} + \frac{0.2}{2} + \frac{0.5}{3} + \frac{0.4}{4} +\right.$$

$$Q = \left\{\frac{0.7}{1} + \frac{0.8}{2} + \frac{0.1}{3} + \frac{0.2}{4} +\right.$$

Q.2	**Attempt the following.**			
a)	Explain features of the membership functic			
b)	Write short note on -			
	1. Standard forms & boundaries			
	2. Angular fuzzy sets			
	OR			
c)	Define classical set. Find (i) $\bar{A}$ (ii) $A \cup B$			

$$A = \left\{\frac{0.4}{a} + \frac{0.3}{b} + \frac{0.6}{c} + \frac{0.5}{p}\right.$$

$$B = \left\{\frac{0.7}{a} + \frac{0.8}{b} + \frac{0.2}{c} + \frac{0.2}{p} + \frac{0.9}{q}\right\}$$

Q.3	**Attempt the following.**			
a)	Two fuzzy sets A & B, both defined on X, are as follows :	08	4	

$$A = \left\{\frac{0.1}{n_1} + \frac{0.3}{n_2} + \frac{0.5}{n_3} + \frac{0.7}{n_4} + \frac{9}{n_5}\right\}$$

$$B = \left\{\frac{0.2}{n_1} + \frac{0.4}{n_2} + \frac{0.6}{n_3} + \frac{0.8}{n_4} + \frac{1}{5}\right\}$$

Examine the following λ -Cut set using Zadeh's notation.

$(i)\ \overline{A_{0.5}}\ \ (ii)\ \bar{B}\ \ (iii)\ (A \cup B)_{0.5}\ \ (iv)\ (\overline{A \cup B})_{0.6}$

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b) Consider two fuzzy sets A & B, both define on X, given as follows. 08 2 CO3

Member	n_1	n_2	n_3	n_4	n_5
A	0.2	0.3	0.4	0.7	0.1
B	0.4	0.5	0.6	0.8	0.9

Express the following Alpha or λ -Cut sets using zardis notation.

$(i)\ (\bar{A})_{0.7}\ \ (ii)\ (B)_{0.2}\ \ (iii)\ (A \cup B)_{0.6}\ \ (iv)\ (A \cap B)_{0.5}$

OR

c) Explain defuzzification methods. 08 2 CO3

Q.4 Attempt the following.

a) Find arithmetic operations on fuzzy member

i) (3, 5) + (2, 3) iii) (5, 4) x (1,

ii) (3, 5) - (2, 3) iv) (3, 4) / (1,

b) Write short note on DSW algorithm.

OR

c) Construct a short note on following with e:

i) Exclusive OR

ii) Exclusive NOR

Q.5 Attempt any two of the following.

a) Explain aggregation of fuzzy sets.

b) Explain natural language in fuzzy logic.

c) Demonstrate Rule based systems.

Q.6 Attempt any two of the following.

a) Explain crisp relation.

b) Explain fuzzy hard C-means.

c) Explain equivalence relation.

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