

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
 TEST -2 EXAMINATION- 2024
 M.Tech-II Semester (ECE/CSE)

COURSE CODE(CREDITS): 22M11CI211(3)
 COURSE NAME: SOFT COMPUTING
 COURSE INSTRUCTORS: MUNISH SOOD

MAX. MARKS: 25

MAX. TIME: 1.5 Hour

Note: (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

(c) The candidate is required to make suitable numeric assumptions wherever required for solving problems

Q1) Suppose we have a simple fuzzy inference system to determine the wash time of a domestic washing machine. Using Mamdani's approach design a controller to determine the wash time of a domestic washing machine. Assume the input as dirt and grease on utensils. Use three descriptors for input variables and five for output variable. Find out the wash time for 20% dirt and 60% grease. [5]CO-2

Q2) Find the membership value assignment using Rank Ordering for the pair wise consumer preference for a brand of cars as given in the following table

	Members who preferred				
	BMW	Benz	Jaguar	Audi	Rolls Royce
BMW	--	51	54	52	67
Benz	48	--	47	84	58
Jaguar	46	62	--	14	53
Audi	45	53	47	--	64
Rolls Royce	26	42	40	38	--

[5]CO-1

Q3) Consider two fuzzy sets

[4]CO-1

$$A_{\sim} = \left\{ \frac{0.7}{50} + \frac{0.4}{70} + \frac{0.3}{90} + \frac{0.8}{110} \right\}$$

$$B_{\sim} = \left\{ \frac{0.4}{50} + \frac{0.7}{70} + \frac{0.6}{90} + \frac{0.3}{110} \right\}$$

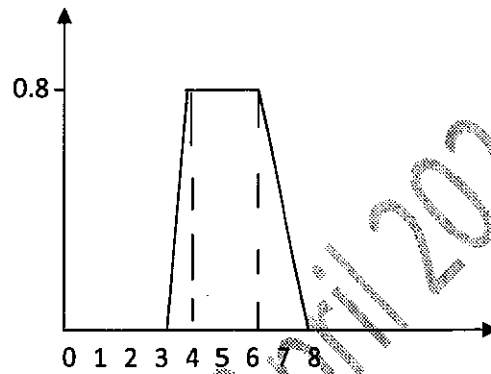
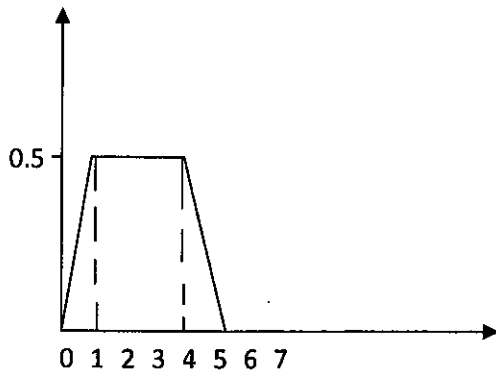
Using lambda cut method of de-fuzzification, find

(i) $\overline{A_{\sim}} \cap \overline{B_{\sim}}$

(ii) $\overline{A_{\sim} \cap B_{\sim}}$ For $\lambda=0.4$

Q4) Using weighted average method for defuzzification, find the union of two fuzzy sets given by the following figure

[3]CO-2



Q5) Write short notes on

[3]CO-3

- Perceptron
- Radial Basis Function neural network
- Sequence to sequence models

Q6) Maximize the function $f(x) = x^2$ where x varies from 0 to 31, using Genetic Algorithm. Choose initial population size $n=4$.

[5] CO-3