

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- 2024

B.Tech-VIII/VI Semester (ECE)

COURSE CODE(CREDITS):18B1WEC851/24B1WEC631(3)

MAX. MARKS: 25

COURSE NAME: SOFT COMPUTING TECHNIQUES

COURSE INSTRUCTORS: MUNISH SOOD

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 control the speed of a fan based on the temperature in a room. The input temperature is crisp and ranges from 0 to 100 degrees Fahrenheit. The output fan speed is also crisp and ranges from 0 to 10. The system has three fuzzy sets for the temperature input: "Cold", "Warm", and "Hot". The following rules govern the system:

1. IF temperature is Cold THEN fan speed $y = 0.03x + 2$
2. IF temperature is Warm THEN fan speed $y = 0.05x$
3. IF temperature is Hot THEN fan speed $y = 0.04x + 1$

Suppose the input temperature is 65 degrees Fahrenheit. What should the output fan speed be according to the Sugeno fuzzy inference system? Use triangular membership function. [5]CO-2

Q2) Find the membership value assignment for an isosceles right angle triangle given by

$$\mu = \{80, 65, 35\} \text{ in degrees.}$$

[5]CO-1

Q3) Consider two fuzzy sets

[5]CO-1

$$A_{\sim} = \left\{ \frac{0.4}{50} + \frac{0.65}{70} + \frac{0.5}{90} + \frac{0.35}{110} \right\}$$

$$B_{\sim} = \left\{ \frac{0.2}{50} + \frac{0.7}{70} + \frac{0.4}{90} + \frac{0.35}{110} \right\}$$

Using lambda cut method of de-fuzzification, find

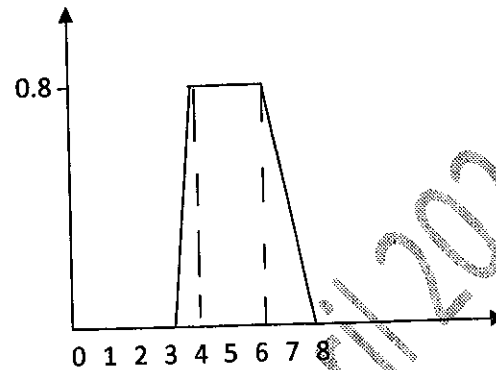
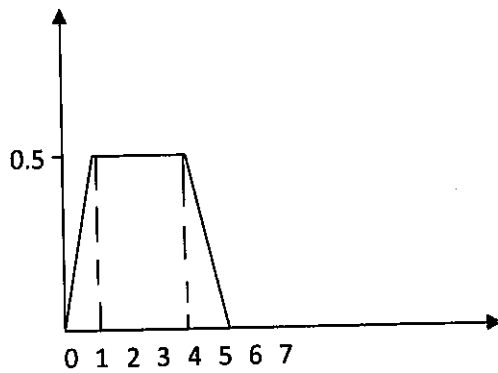
(i) $\overline{A_{\sim}} \cap \overline{B_{\sim}}$

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

For $\lambda=0.2$

Q4) Using centroid method find the union of two fuzzy sets given by the following figure

[5]CO-1



Q5) Write short notes on

[5]CO-4

- Multi Layer Perceptron
- Convolutional Neural Network
- Radial Basis Function Neural Network
- Recurrent Neural network
- Long Short Term Neural networks

JUT Test II Examination April 2024