JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- MARCH-2023

COURSE CODE(CREDITS): 21M1WEC233 (3) MAX. MARKS: 15

COURSE NAME: Applied Machine Learning for IoT

COURSE INSTRUCTORS: Munish Sood MAX. TIME: 1 Hour

Note: *All questions are compulsory. Marks are indicated against each question in square brackets.*

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 temperature input is 75 degrees Fahrenheit. What should the output fan speed be according to the Sugeno fuzzy inference system? Use triangular membership function.**CO-1 (5)**

Q2) Maximize the function $f(x) = x^2$ where x varies between 0 and 31 using genetic algorithm. **CO-2 (5)**

Q3) Consider two fuzzy sets **CO-1(5)**

$$A_{\sim} = \left\{\frac{1}{10} + \frac{0.25}{20} + \frac{0.5}{30} + \frac{0.65}{50}\right\}$$

$$B_{\sim} = \left\{\frac{0}{10} + \frac{0.7}{20} + \frac{0.4}{30} + \frac{0.35}{50}\right\}$$

Using lambda cut method of de-fuzzification, find

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

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

For λ=0.2