JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- 2025
B.Tech-I Semester (CSE/IT/ECE/CE/BT/BI)
COURSE CODE (CREDITS): 24B1WEM831(2)   MAX. MARKS: 25
COURSE NAME: SOFT COMPUTING PARADIGMS
COURSE INSTRUCTORS: MUNISH SOOD   MAX. TIME: 1 Hour 30 Min

Note: (a) *All questions are compulsory.*
       (b) *The candidate is allowed to make Suitable numeric assumptions wherever required*
       for solving problems

Q.No	Question	CO	Marks
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.	2	5
Q2	Compare two sensors based on their detection level and Gain settings. {table below}	1	5
Q3	Given a fuzzy relations $\tilde{R} = \begin{bmatrix} 0.3 & 0.4 \\ 0.5 & 0.2 \end{bmatrix}$ between two fuzzy sets $\tilde{X}$ and $\tilde{Y}$. Similarly $\tilde{S} = \begin{bmatrix} 1 & 0.2 & 0.4 \\ 0.8 & 0.3 & 0.7 \end{bmatrix}$ between two fuzzy sets $\tilde{Y}$ and $\tilde{Z}$. Obtain fuzzy relation T as a composition between fuzzy relations using Max-Product composition.	2	4
Q4	Write short notes on a) Multi Layer Perceptron b) Convolutional Neural Network c) Radial Basis Function Neural Network	4	6
Q5	Find the membership value assignment for an isosceles right angle triangle given by $\mu = \{70,60,50\}$ in degrees.	3	5

Table for Q2:

Gain Setting	Detection level of Sensor 1	Detection level of sensor 2
0	0	0
10	0.2	0.45
20	0.35	0.25
30	0.65	0.70
40	0.75	0.95
50	0.1	0.1