Roll No. .....

22643

M. Tech. 2nd Semester (CSE)
CBCS Scheme
Examination – June, 2023

SOFT COMPUTING

Paper : MTCSE22C1

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is ***compulsory***. All questions carry equal marks.

1. Write short notes on the following :

(a) Difference between Adaline and Perceptron. 5

(b) Explain Hebb's Learning Rule. 5

(c) What do you mean by fuzzy sets ? Explain fuzzy set operations with example. 5

(d) Differentiate between ANN and BNN. 5

UNIT – I

2. (a) Discuss Hebbian Learning rule and winner-take all learning rule. 10

(b) What do you mean by Perceptron ? Explain Perceptron algorithm. 10

3. What do you mean by Hetro Associative memory network ? Explain its training algorithm and retrieval algorithm. Using Hebb rule to store the following vectors in an Hetro Associative Neural Net. 20

INPUT	OUTPUT
S1 = (1100)	T1 = (10)
S2 = (0100)	T2 = (10)
S3 = (0011)	T3 = (01)
S4 = (0010)	T4 = (01)

Also test the net with training input vector.

UNIT – II

4. (a) Define fuzzy set. How it is different from crisp set. Explain the following operations on fuzzy sets : Union, Intersection, Complement and Composition. 10

(b) Define fuzzy sets to express water temperature (Chilled, cool, warm, hot, very hot) and draw membership diagram for it. 10

5. (a) Consider two fuzzy sets A and B as follows : 10

$A = \left\{\frac{1}{2} + \frac{0.3}{4} + \frac{0.5}{6} + \frac{0.2}{8}\right\}$ and $B = \left\{\frac{0.5}{2} + \frac{0.4}{4} + \frac{0.1}{6} + \frac{1}{8}\right\}$

Perform union, intersections, difference and complement over fuzzy set A and B.

(b) What is Defuzzification ? Explain the following methods of Defuzzification : 10

(i) Centroid method

(ii) Mean Max Method

(iii) Centre of Sum

UNIT – III

6. Explain the following : 20

(a) Multi-Valued logic

(b) Fuzzy Propositions

(c) Fuzzy Qualifiers

7. Compute A(+)B and A(–)B, where 20

$$\mu_A(x) = \begin{cases} 0 & x \le -6 \\ (x+6)/4 & -6 < x \le -2 \\ (-x+3)/5 & -2 < x \le 3 \\ 0 & x > 3 \end{cases}$$

$$\mu_B(x) = \begin{cases} 0 & x \le -1 \\ (x+1)/5 & -1 < x \le 4 \\ (-x+10)/6 & 4 < x \le 10 \\ 0 & x > 10 \end{cases}$$

UNIT – IV

8. Describe the terms non specificity and fuzziness. Differentiate between these two terms and for the following fuzzy set compute both fuzziness and non-specificity. 20

$$A(x)=\begin{cases} 0 & x<0 \ \& \ x>10 \\ x/5 & 0\le x\le 5 \\ (10-x)/5 & 5\le x\le 10 \end{cases}$$

9. Write a short note on the following : 20

(a) Fuzziness of fuzzy sets

(b) Uncertainty Based Information
