

# AE-120

April-2019

4<sup>th</sup> Year Integrated M.Sc. (CA & IT), Sem.-VIII

## Soft Computing

Time : 2:30 Hours]

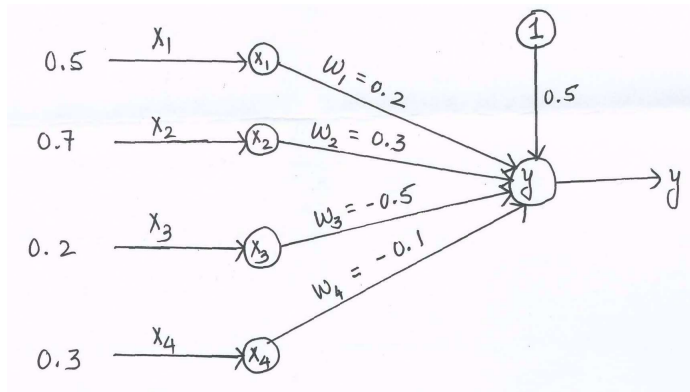
[Max. Marks : 70

1. (a) State any fifteen application scope of Artificial Neural Network. 7
- (b) Explain Architecture of a simple artificial neuron net. 7

OR

For the network shown in figure, calculate the net input to the output neuron.

Use Binary and Bipolar Sigmoid Activation Function



2. (a) Explain Back Propagation Network. Draw the Architecture of Back Propagation Network. 7
- (b) Explain Simulated Annealing Network. 7
3. (a) List all the elements of following sets : 3
  - (i)  $A = \{x : x \text{ is an integer, } x^2 \leq 4\}$
  - (ii)  $B = \{y : y \text{ is a vowel in the English Alphabet}\}$
  - (iii)  $C = \{z : z = \frac{n}{n+1} \cdot \text{Where } n \text{ is a natural number and } 1 \leq n \leq 6\}$

- (b) There are exactly three types of students in a school: the geeks, the wannabees, and the athletes. Each student is classified into at least one of these categories. And the total number of students in the school is 1000. Suppose that the following is given : 7

The total number of students who are geeks is 310.

The total number of students who are wannabees is 650.

The total number of students who are athletes is 440.

The total number of students who are both geeks and wannabees is 170.

The total number of students who are both geeks and athletes is 150.

The total number of students who are both wannabees and athletes is 180.

What is the total number of students who fit into all 3 categories ?

**OR**

Explain in brief : Fuzzy versus Crisp.

- (c) Consider two given fuzzy sets given below. Perform Union, Intersection, Difference and Disjunctive Sum. 4

$$\tilde{A} = \{(x_1, 1), (x_2, 0.3), (x_3, 0.5), (x_4, 0.2)\}$$

$$\tilde{B} = \{(x_1, 0.5), (x_2, 0.4), (x_3, 0.1), (x_4, 1)\}$$

4. (a) Explain Control System Design. 7  
(b) Write a short note on Genetic Algorithm. 7

5. (a) Explain Bitwise Operators in detail. 7  
(b) Explain Neuro-Fuzzy Hybrids. 5

**OR**

Explain Neuro-Genetic Hybrids.

- (c) Define Crossover. 2