

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -III EXAMINATION- 2024

B.Tech-VIII/VI Semester (ECE)

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

MAX. MARKS: 35

COURSE NAME: SOFT COMPUTING TECHNIQUES

COURSE INSTRUCTORS: MUNISH SOOD

MAX. TIME: 2 Hours

*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)** Maximize the function  $f(x) = x^2$  where  $x$  varies from 0 to 31, using Genetic Algorithm. Choose initial population size  $n=4$ . **[5] CO-3**

**Q2)** Consider an Adaptive resonance theory type 1 (ART-1) net with 5 input units and 3 cluster units. After some training the net attains the bottom-up  $B_{3 \times 5}$  and top-down  $T_{3 \times 5}$  weight matrices as shown below. Show the behavior of the net if it is presented with the training pattern  $s = [0, 1, 1, 1, 1]$ . Assume learning rate  $L=2$  and vigilance parameter  $\rho=0.8$ . **[5] CO-4**

$$B_{3 \times 5} = \begin{bmatrix} 2 & 0 & 2 \\ 5 & 8 & 2 \\ 5 & 5 & 2 \\ 5 & 8 & 2 \\ 1 & 0 & 2 \end{bmatrix} \text{ and } T_{3 \times 5} = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 1 & 1 & 0 \\ 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

**Q3)** Implement OR gate using Widrow Hoff Delta learning rule for artificial neural networks. **[5] CO-3**

**Q4)** Implement XOR gate using multilayer perceptron network. **[5] CO-4**

**Q5)** Using Hebb's rule find weights required to perform the following classification of given input pattern. '+' symbol represents the value +1 and empty symbol equals -1. Consider "I" belongs to the members of the class and hence target value = 1 and "O" does not belong to the members of the class and hence target value = -1. **[5] CO-3**

+		+
	+	
+		+

"I"

+	+	+
+	+	+

"O"

Q6) Write short notes on the following

[10] CO-3

- a) Credit Assignment Problem
- b) Competitive learning rule
- c) Kohonen Self organizing Maps
- d) Memory based learning rule
- e) Delta learning rule for single layer neural network

JUIT TEST-3 EXAMINATION JUNE-2024