Graphic Era
HILL UNIVERSITY
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Mid Term (Odd) Semester Examination October 2024

Roll no.....

Name of the Course and semester: BCA V Sem
Name of the Paper: Soft Computing
Paper Code: TBC 505(3)
Time: 1.5-hour Maximum Marks: 50

Note:

(i) Answer all the questions by choosing any one of the sub-questions
(ii) Each question carries 10 marks.
(iii) Please specify COs against each question.

Q1. (10 Marks)

a. Define Soft Computing. How is it different from Hard Computing? Why is Soft Computing important? Illustrate the Various applications of Soft Computing with relevant examples. (CO1)

OR

b. Explain Hebb's learning rule for a neural network. Implement AND function using bipolar inputs and targets using The Hebb rule method. (CO2))

Q2. (10 Marks)

a. Define Perceptron Learning. Find the weights required to perform the following classifications using the perceptron network: The vectors (1, 1, 1, 1) and (-1,1, -1, -1) belong to a class having target value 1. The vectors (1, 1, 1, -1) and (1, -1, 1, 1) are belonging to a class having target value -1. Assume the learning rate is 1 and the initial weights as 0. (CO 2)

b. (i) Implement AND function using McCulloch-Pitts neuron (use binary data representation). (CO1)

(ii) Obtain the output of the neuron for a network with inputs given as [x1, x2] = [0.7, 0.8], and the weights are [w1, w2] = [0.2, 0.3] with bias = 0.9. Use Binary sigmoidal activation and Bipolar sigmoid activation function. (CO1)

OR

Q3. (10 Marks)

a. Explain (CO1)

(i) The architecture and functioning of the Hopfield Network.
(ii) Need for Sof Computing

OR

b. Use the Adaline network to train AND function with bipolar inputs and targets. Calculate the total mean error after one epoch of training. The weights and bias initially assumed a random value, say 0.2. The learning rate is also set to 0.2. (CO2)

Q4. (10 Marks)

a. (i) What is the activation function? Explain the several activation functions used in ANNs. (CO1)
(ii) Compare and contrast biological and artificial neural networks.

OR

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b. Explain the architecture and training algorithm of the Back Propagation network. Describe the various terminologies used in the algorithm. (CO2)

Q5. (10 Marks)

a. Write short note on: (CO1)

(i) Explain the concept of Self-Organizing Feature Maps (SOFM).

(ii) Discuss the Radial Basis Function Network (RBFN)

OR

b. What is a Bidirectional Associative Memory (BAM)? Train a BAM network to store the input vectors s= (s1, s2,s3,s4) to the output vector t=(t1,t2). The training input-target output vector pairs are in binary form. The vector pairs are given in the table (CO2)

Input/ Target	s1	s2	s3	s4	t1	t2
1	1	0	0	0	0	1
2	1	1	0	0	0	1
3	0	0	0	1	1	0
4	0	0	1	1	1	0