ABES Engineering College, Ghaziabad

B.Tech Odd/Even Semester Sessional Test-1

Printed Pages: 3
Session: 2022-23
Roll No.
Date of Exam: 20 October
Time:10–12 PM

Course Code:KCS056

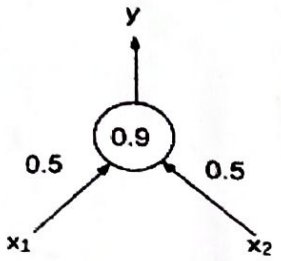
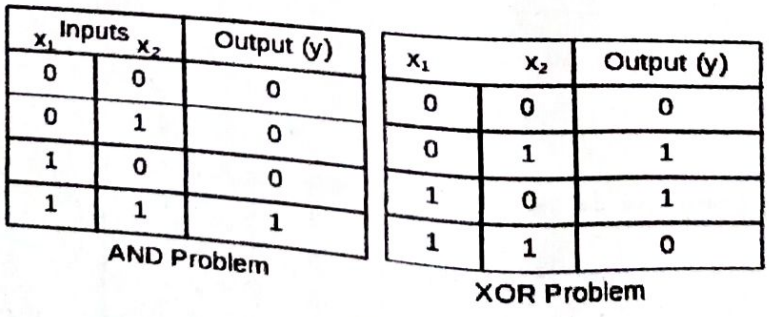
Course Name:Applications of Soft Computing

Maximum Marks:75

Instructions:

1. Attempt All sections.

2. If require any missing data, then choose suitably.

Q.No.	Question	Marks	CO	KL	PI
	Section-A				
1	**Attempt ALL Parts**	**(5x2=10)**			
a)	List any five applications of neural networks.	2	CO1	K1	1.3.1
b)	List any one real-life application for each of supervised learning, unsupervised learning and reinforcement learning techniques.	2	CO1	K1	1.2.1
c)	How does the learning rate (α) and bias (b) parameter impact in artificial neural networks?	1+1	CO2	K2	2.3.1
d)	Compute the result Y of a single neuron when input $X_1 = X_2 = 1$ and threshold is 0.9 as given in figure below. 	2	CO1	K1	2.4.1
e)	Differentiate fuzzy set and crisp set with the help of example of each.	2	CO3	K1	1.3.1
	Section-B				
2	**Attempt ANY ONE part from the following**	**(1x5=5)**			
a)	A 4-input neuron has weights 1, 2, 3 and 4. The transfer function is linear with the constant of proportionality being equal to 2. The inputs are 4, 10, 5 and 20 respectively. Compute the output Y.	5	CO1	K3	2.4.1
b)	Design a single artificial neuron model and explain each component with neat and clean diagram.	5	CO1	K2	1.4.1
3	**Attempt ANY ONE part from the following**	**(1x5=5)**			
a)	Explain the concept of linearly seperable and linearly nonseperable tasks with the help of examples of AND and XOR problem. 	2.5+2.5	CO2	K1	2.4.1
b)	Summarize the steps of backpropagation error correction method in multilayer feed forward network. Also explain the significance of gradient direction in order to optimize the loss function.	2.5+2.5	CO2	K1	1.4.1

4	**Attempt ANY ONE part from the following**	**(1x5=5)**			
a)	What are the advantages and disadvantages of fuzzy logic?	5	**CO3**	K1	1.3.1
b)	Differentiate fuzzyfication and defuzzification process with the help of an example..	5	**CO3**	K2	2.4.1

Section-C

5	**Attempt ANY ONE part from the following**	**(1x10=10)**			
a)	Define activation function and it's importance in Artificial neural network. Explain and illustrate any five activation function with their mathematical formula and plotting (Diagram).	5+5	**CO1**	K2	1.3.1
b)	Calculate the weights of a single neural network which computes the following function. Construct the neural network and show the weight computations. The training set is given below: x_1 x_2 x_3 $o(x_1, x_2, x_3)$ 1. 1 1 1 1 2. 1 1 0 1 3. 1 0 0 1 4. 0 1 1 0 5. 0 0 1 0 6. 0 1 0 0 7. 1 0 1 1	5	**CO1**	K4	2.4.1
6	**Attempt ANY ONE part from the following**	**(1x10=10)**			
a)	Train a hetroassociative memory network using Hebb rule to store input row vector s=(s1,s2,s3,s4) to output row vector t=(t1,t2), the vector pair given in table bellow. **Inputs and Targest** | **s1** | **s2** | **s3** | **s4** | **t1** | **t2** **1st** | 0 | 1 | 1 | 1 | 1 | 0 **2nd** | 1 | 1 | 0 | 1 | 1 | 0 **3rd** | 1 | 1 | 1 | 1 | 0 | 1 **4th** | 0 | 1 | 0 | 0 | 0 | 1	10	**CO1**	K4	
b)	What do you understand by the concept of computing? What are the charecteristics of hard and Soft Computing?	5+5	**CO1**	K4	
7	**Attempt ANY ONE part from the following**	**(1x10=10)**			
a)	For a given input vector X=[1,0,1,-1,2], weight vector W=[0,-1,-1,-1,1] and biase B=+2, computer the output of a single neuron having following activation function. a) Linear b) threshold (0.5) c) Rectified Linear Unit (ReLU) d) sigmoid and e) tanh (tansigmoid).	2+2+2+2+2	**CO2**	K3	2.4.1
b)	Train a hetroassociative memory network using Outer product rule to store input row vector s=(s1,s2,s3,s4) to output row vector t=(t1,t2), the vector pair given in table bellow. **Inputs and Targest** | **s1** | **s2** | **s3** | **s4** | **t1** | **t2** **1st** | 1 | 0 | 1 | 1 | 1 | 0 **2nd** | 1 | 0 | 0 | 1 | 1 | 0 **3rd** | 1 | 1 | 1 | 1 | 0 | 1 **4th** | 0 | 0 | 0 | 0 | 0 | 1	10	**CO2**	K4	2.4.1
8	**Attempt ANY ONE part from the following**	**(1x10=10)**			