QP Code: RN21BTECH583 | Reg. No | | | | | | | | | | | AR 21

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Seventh Semester - Regular) Examinations, November – 2024

21BECOE47011 – Soft Computing

ECE

Time: 3 hrs | Maximum: 70 Marks

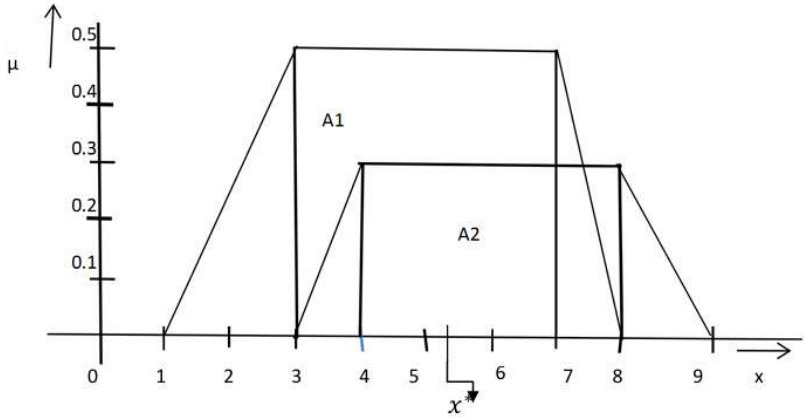
Answer ALL questions

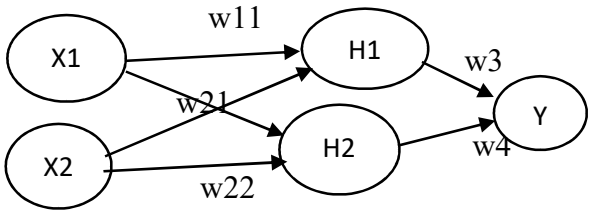
(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. Explain the Fuzzy System Architecture.	CO1	K1
b. Define alpha cut, strong alpha cut sets and level sets of a give fuzzy set.	CO1	K2
c. List down the names of some popular Activation Functions used in Neural Networks with mathematical notation.	CO1	K1
d. What do you mean by perceptron, and explain it.	CO1	K1
e. Explain the operators in Genetic Algorithm.	CO1	K1

PART – B **(15 x 4 = 60 Marks)**

Answer ***All*** the questions	Marks	CO #	Blooms Level
2. a. A = {(X_1, 0.6), (X_2, 0.2), (X_3, 1), (X_4, 0.4)}, B = {(X_1, 0.1), (X_2, 0.8), (X_3, 0), (X_4, 0.9)}. Find the A U B, A ∩ B, A+B, A-B, A × B, A ⊕ B, Bounded Sum	8	CO1	K2
b. $R_1 = \begin{array}{c\|ccc} & y_1 & y_2 & y_3 \\ x_1 & 0.1 & 0.3 & 0.4 \\ x_2 & 0.2 & 0.1 & 0.5 \end{array}$ $R_2 = \begin{array}{c\|cc} & y_1 & y_2 \\ x_1 & 0.5 & 0.2 \\ x_2 & 0.7 & 0.1 \\ x_3 & 0.2 & 0.6 \end{array}$ Find MAX-MIN composition (ii) MAX-PROD composition	7	CO1	K1
(OR)			
c. Explain the defuzzification process.	8	CO1	K1
d.  Find the defuzzied value using CoG method.	7	CO1	K2
3.a. Implement AND function and OR function using McCulloch-Pitts neuron.	8	CO2	K2
b. Explain about the Single layer perceptron and Multilayer perceptron.	7	CO2	K1
(OR)			

c.	X= {1,3,5} ;Y= {1,3,5} ;R= {(x, y)|y=x+2} ;S={ (x ,y)|x<y}, Here, R and S is on X×Y. Find the max-min composition R.S	8	CO2	K2
d.	State and prove D'Morgan's Laws for the following fuzzy sets $A = \{(x_1, 0.2), (x_2, 0.3), (x_3, 0.7)\}$ $B = \{(x_1, 0.3), (x_2, 0.9), (x_3, 0.5)\}$	7	CO2	K2
4.a.	Construct a LVQ net to cluster five vectors assigned to two classes. Vectors = {(1001), (1100), (0110), (1000), (0011)} with classes for each vector as {1,2,1,2,1} respectively. Use learning rate 0.2, and perform only one epoch of training.	8	CO3	K2
b.	Design a Hebb net to implement logical AND function. (use bipolar inputs and target)	7	CO3	K2
	(OR)			
c.	 W11=0.6, w12=0.1, W21=-0.3, w22=0.5, W3=0.4, w4=0.1, Y=1, α=0.5, sigmoid function, Apply back propagation to update the weight.	8	CO3	K2
d.	Implement AND gate using Hebb's model.	7	CO3	K2
5.a.	Construct a Kohonen self-organizing map to cluster the four given vectors, [0 0 1 1], [1 0 0 0], [0 1 1 0] and [0 0 0 1]. the number of clusters to be formed is two. Assume initial learning rate is 0.5. take weight as w1=[0.2 0.4 0.6 0.8],w2=[0.9,0.7,0.5,0.3].	8	CO4	K2
b.	Explain about the Recurrent Neural Network.	7	CO4	K2
	(OR)			
c.	What do you mean by Evolutionary computing, Explain the Genetic algorithm.	8	CO4	K2
d.	Write notes on ANFIS with a diagram.	7	CO4	K2

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