Printed Page:- Subject Code:- ACSE0307

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech.

SEM: III - CARRY OVER THEORY EXAMINATION - JUNE (2021 - 2022)

Subject: Soft Computing

Time: 3 Hours Max. Marks: 100

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.
2. Section A - Question No- 1 is 1 marker & Question No- 2 carries 2 mark each.
3. Section B - Question No-3 is based on external choice carrying 6 marks each.
4. Section C - Questions No. 4-8 are within unit choice questions carrying 10 marks each.
5. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A 20

1. Attempt all parts:-

1-a. Who initiated the idea of Soft Computing? (CO1) 1

(a) Charles Darwin

(b) Lotfi A Zadeh

(c) Rechenberg

(d) Mc_Culloch

1-b. Core of soft Computing is ..... (CO1) 1

(a) Fuzzy Computing, Neural Computing, Genetic Algorithms

(b) Fuzzy Networks and Artificial Intelligence

(c) Artificial Intelligence and Neural Science

(d) Neural Science and Genetic Science

1-c. In artificial Neural Network, interconnected processing elements are called ..... (CO2) 1

(a) nodes or neurons

(b) weights

(c) axons

(d) Soma

1-d. In which ANN, loops are allowed? (CO2) 1

(a) Feed Forward ANN

(b) Feedback ANN

(c) Both Feed Forward and Feedback ANN

(d) None of these

1-e. The train is running very fast. Here Very fast can be represented by ..... (CO3) 1

(a) Fuzzy Set

(b) Crisp Set

(c) Fuzzy & Crisp Set

(d) None of the mentioned

1-f. Consider two fuzzy sets A and B with their membership functions μ_A and μ_B. Then De Morgan's law can be defined as (CO3) 1

(a) $(A \cup B)^c = A^c \cup B^c$

(b) $(A \cup B)^c = A^c \cap B^c$

(c) $(A \cup B)^c = A^c \cup B^c$

(d) $(A \cup B)^c = A^c \cap B^c$

1 If x is A then y is B else y is C then the relation R is equivalent to: (CO4) 1

(a) (A x B) + (A x C)

(b) (A x B) U $\bar{}$(A$^-$ x C)

(c) (A x B) -> (B x C)

(d) (A x C) U (B x C)

1 Given two fuzzy set A and B, A ={(1, 0.5), (2, 0.1), (3, 0.4)} and B = {(1, 0.2), (2, 0.3), (3, 0.5)} Then union of the two fuzzy set i.e. A ∪ B is given by: (CO4) 1

(a) {(1, 0.5), (2, 0.1), (3, 0.4)}

(b) {(1, 0.5), (2, 0.3), (3, 0.5)}

(c) {(1, 0.2), (2, 0.3), (3, 0.5)}

(d) {(1, 0.2), (2, 0.1), (3, 0.4)}

1-i. If the parent solutions are 1110111 and 1010101 and if the crossover site is 5,which of the following indicates one of the new offspring (CO5) 1

(a) 1110101

(b) 1110011

(c) 1010001

(d) 1110110

1-j. "Cross over probability is 1" states that: (CO5) 1

(a) all offspring are made by cross over

(b) Offspring is made from exact copies of chromosomes

(c) Both of these

(d) None of these

2. Attempt all parts:-

2.a. What is an activation function? (CO1) 2

2.b. Define Supervised learning. (CO2) 2

2.c. Explain Fuzzy If Then rule with example. (CO3) 2

2.d. Explain Fuzzification in brief. (CO4) 2

2.e. State Binary Encoding in Genetic Algorithm. (CO5) 2

SECTION B 30

3. Answer any <u>five</u> of the following:-

3-a. What is soft computing? How is it different from Hard computing? (CO1) 6

3-b. What are the characteristic of neural network? (CO1) 6

3-c. Explain (1) binary sigmoidal activation function, (2) bipolar sigmoidal activation function (CO2) 6

3-d. Discuss the Adaline Neural Network system with suitable diagram. (CO2) 6

3.e. A = {(x1,0.5),(x2,0.1),(x3,0.4)}, B = {(x1,0.2),(x2,0.3),(x3,0.5)} Calculate the Disjunctive sum of the fuzzy set. (CO3) 6

3.f. Define and explain defuzzification and explain the different defuzzification methods. (CO4) 6

3.g. Differentiate Genetic Algorithm verses Traditional Algorithm. (CO5) 6

SECTION C 50

4. Answer any <u>one</u> of the following:-

4-a. Draw the Structure of a Biological Neuron and explain in detail. (CO1) 10

4-b. Discuss five major applications of soft computing. (CO1) 10

5. Answer any <u>one</u> of the following:-

5-a.	Calculate the Output of Neural Network for the inputs x1=0.3, x2 = 0.4 and bias b=1 with weight of 0.3 for bipolar activation function. Assume w1=w2=1 . (CO2)	10
5-b.	Write difference between Adaline and Madaline approaches in ANN? (CO2)	10
6. Answer any one of the following:-		
6-a.	Give the properties of fuzzy sets and also explain the operations involved in it. (CO3)	10
6-b.	Describe Fuzzy relation and explain its various operations. (CO3)	10
7. Answer any one of the following:-		
7-a.	Define the term truth table. Give all fuzzy connectives used along with its truth table. (CO4)	10
7-b.	Explain Air Conditioner Control using fuzzy logic. (CO4)	10
8. Answer any one of the following:-		
8-a.	Explain Roulette Wheel Selection Method And Rank Selection Method. (CO5)	10
8-b.	State the procedure of Genetic Algorithm and Draw the flow chart of Genetic Algorithm. Explain the Biological Background of GA. (CO5)	10