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 - SEPTEMBER 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. What are the 2 types of learning. (CO1) 1

(a) Improvised and unimprovised

(b) supervised and unsupervised

(c) Layered and unlayered

(d) None of the above

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

(a) Charles Darwin

(b) Lotfi A Zadeh

(c) Rechenberg

(d) Mc_Culloch

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. What is full form of ANNs? (CO2) 1

(a) Artificial Neural Networks

(b) Artificial Neural numbers

(c) Artificial Neural Node

(d) none of the mentioned

1-e. The cardinality of the given set A= {2,4,6,8} is: (CO3) 1

(a) 2

(b) 5

(c) 4

(d) 1

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-g. Defuzzification is done to obtain _____ . (CO4) 1

(a) Crisp output

(b) The best rule to follow

(c) Precise fuzzy value

(d) None of the above

1-h. 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. $A \cup B$ 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 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	Genetic algorithm operators are ..... (CO5)		1

(a) Selection

(b) Crossover

(c) Mutation

(d) All of the above

2. Attempt all parts:-

2.a.	What is an activation function? (CO1)	2
2.b.	Why ANN is called as Parallel Distributed Processing? (CO2)	2
2.c.	Verify De morgan's law using truth table. (For 3 state) (CO3)	2
2.d.	Discuss in detail Fuzzy If Then rule with example. (CO4)	2
2.e.	Discuss the need of Mutation in Genetic Algorithm. (CO5)	2

SECTION B 30

3. Answer any five of the following:-

3-a.	How human brain is related to ANN? (CO1)	6
3-b.	Describe the linear and nonlinear activation functions used in Artificial Neural Networks. (CO1)	6
3-c.	Explain the architecture of ANN model? (CO2)	6
3-d.	Calculate the net input for x1=0.2, x2=0.6, and bias b=1 with weight 0.3.Assume w1=w2=1. (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 union and intersection operation of the fuzzy set. (CO3)	6
3.f.	Discuss the major components of fuzzy controller with a neat sketch. (CO4)	6
3.g.	Explain the differences between traditional and genetic algorithm. (CO5)	6

SECTION C 50

4. Answer any one of the following:-

4-a.	Draw the Structure of a Biological Neuron and explain in detail. (CO1)	10
4-b.	Explain Various types of Soft Computing Techniques. (CO1)	10

5. Answer any one of the following:-

5-a. Draw and explain the Multilayer Feedforward ANN model through an appropriate example. (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. The task is to recognize English alphabetical characters (F, E, X, Y, I, T) in an image processing system. Two fuzzy sets $\tilde{I}$ and $\tilde{F}$ are defined to represent the identification of characters I and F. 10

Let $\tilde{I}$ = {(F, 0.4), (E, 0.3) (X, 0.1), (Y, 0.1), (I, 0.9), (T,0.8)} ,

$\tilde{F}$ = {(F, 0.99), (E, 0.8), (X,0.1), (Y; 0.2), (I,0.5), (T, 0.5)}

Find the following: (i) $\tilde{I} \cup \tilde{F}$ (ii) $\tilde{I} - \tilde{F}$ (iii) $\tilde{F} \cup \overline{\tilde{F}}$ (iv) Verify de Morgan's law (CO3)

7. Answer any one of the following:-

7-a. Differentiate between Predicate logic and Fuzzy Logic. (CO4) 10

7-b. Explain fuzzy connectives like Negation, Disjunction, Conjunction, and Implication. (CO4) 10

8. Answer any one of the following:-

8-a. Explain Roulette Wheel Selection Method And Rank Selection Method. (CO5) 10

8-b. Define the terms chromosome, fitness function, crossover and mutation as used in genetic algorithms. (CO5) 10