QPC: RN18001304 AR - 18 Reg. No. | | | | | | | | | | |

GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

B. Tech Degree Examinations, November – 2021

(Seventh Semester)

BCSOE7051 / BITOE7051 – Soft Computing

(AEI /CSE / ECE / I.T)

Time: 3 hrs Maximum: 100 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) (2 x 10 =20 Marks)

Q.1. Answer ***ALL*** questions [CO][PO]

a. Any soft-computing methodology is characterised by CO1PO1

(i) Precise solution (ii)Control actions are unambiguous and accurate

(iii)Control actions is formally defined (iv) Algorithm which can easily adapt with the change of dynamic environment

b. For what purpose Feedback neural networks are primarily used? CO1PO1

(i) Classification (ii) Feature mapping

(iii) Pattern mapping (iv) None of the mentioned

c. A fuzzy set whose membership function has at least one element x in the universe whose membership value is unity is called CO2PO2

(i) sub normal fuzzy sets (ii) normal fuzzy set

(iii) convex fuzzy set (iv) concave fuzzy set

d. Which of the following neural networks uses supervised learning? CO2PO2

A)Multilayer-perceptron
(B)Self-organizing-feature-map
(C) Hopfield network

(i) (A) only (ii) (B) only

(iii) (A) and (B) only (iv) (A) and (C) only

e. What is the feature of ANNs due to which they can deal with noisy, fuzzy, inconsistent data? CO2PO2

(i) associative nature of networks (ii) distributive nature of networks

(iii) both associative & distributive (iv) none of the mentioned

f. Fitness function should be CO2PO1

(i) maximum (ii) minimum

(iii) intermediate (iv) none of these

g. Genetic algorithms are example of CO1PO2

(i) heuristic (ii) Evolutionary algorithm

(iii) ACO (iv) PSO

h. Applying recombination and mutation leads to a set of new candidates, called as ? CO3PO2

(i) sub parents (ii) parents

(iii) offsprings (iv) grand child

i. What are the following sequence of steps taken in designing a fuzzy logic machine ? CO1PO2

(i) Fuzzification → Rule evaluation → Defuzzification (ii) Fuzzification → Defuzzification → Rule evaluation

(iii) Rule evaluation → Fuzzification → Defuzzification (iv) Rule evaluation → Defuzzification → Fuzzification

j. If A and B are two fuzzy sets with membership functions $\mu A(x)$ = {0.6, 0.5, 0.1, 0.7, 0.8} $\mu B(x)$ = {0.9, 0.2, 0.6, 0.8, 0.5} Then the value of $\mu(A \cup B)(x)$ will be CO3PO2

(i) {0.9, 0.5, 0.6, 0.8, 0.8} (ii) {0.6, 0.2, 0.1, 0.7, 0.5}

(iii) {0.1, 0.5, 0.4, 0.2, 0.2} (iv) {0.1, 0.5, 0.4, 0.2, 0.3}

PART – B: (Short Answer Questions) **(2 x 10 = 20 Marks)**

Q.2. Answer ***ALL*** questions [CO][PO]

a. Write the characteristics of soft computing. CO1PO1
b. Draw the structure of a neuron cell. CO2PO2
c. What is the role of bias in neural network? CO2PO1
d. Differentiate between supervised learning and unsupervised learning. CO1PO2
e. How does fuzzy logic differ from crisp logic. CO3PO2
f. What is generalised modus ponen and generalised modus tollen rule in Fuzzy logic? CO3PO1
g. How does gradient descent learning minimize the error? CO2PO1
h. Explain core, support and boundary of a fuzzy set. CO3PO2
i. What do you mean by mutation operation in genetic algorithm? CO4PO2
j. What is the output of a>>2 operation if a=1010 0110? CO4PO3

PART – C: (Long Answer Questions) **(15 x 4 = 60 Marks)**

Answer ***ALL*** questions | Marks | [CO][PO]

3. a. What is the difference between soft computing and hard Computing ? 5 CO1PO1
b. Write down different types of soft computing technique with its applications. 10 CO2PO2

(OR)

c. How is the single layer Perceptron used to implement AND function? 5 CO1PO1
d. What is activation function? Discuss different activation functions. 10 CO2PO2

4. a. Explain Back propagation algorithm with example. 10 CO2PO1
b. Write the importance of Delta rule 5 CO3PO2

(OR)

c. Consider a set P={p1,p2,p3,p4} of four varieties of paddy plants, set D={D1,D2,D3,D4} of the various diseases affecting plants and S={s1,2,s3,s4} be the common symptoms of the diseases. Let ˜R be the relation on P*D and ˜S be the relation on D*S as given below. 10 CO2PO1

$$\tilde{R} = \begin{array}{c} \\ P_1 \\ P_2 \\ P_3 \\ P_4 \end{array} \begin{array}{c} \begin{array}{cccc} D_1 & D_2 & D_3 & D_4 \end{array} \\ \begin{bmatrix} 0.6 & 0.6 & 0.9 & 0.8 \\ 0.1 & 0.2 & 0.9 & 0.8 \\ 0.9 & 0.3 & 0.4 & 0.8 \\ 0.9 & 0.8 & 0.1 & 0.2 \end{bmatrix} \end{array} \qquad \tilde{S} = \begin{array}{c} \\ D_1 \\ D_2 \\ D_3 \\ D_4 \end{array} \begin{array}{c} \begin{array}{cccc} S_1 & S_2 & S_3 & S_4 \end{array} \\ \begin{bmatrix} 0.1 & 0.2 & 0.7 & 0.9 \\ 1 & 1 & 0.4 & 0.6 \\ 0 & 0 & 0.5 & 0.9 \\ 0.9 & 1 & 0.8 & 0.2 \end{bmatrix} \end{array}$$

Obtain the association of the plants with the different symptoms of the disease using max-min composition.

d. Explain basic fuzzy set operations with example 5 CO3PO2

5. a. What is Defuzzification ? 5 CO3PO2
b. Explain Mamdani-Suzzeno fuzzy model with example. 10 CO3PO2

OR

c. What is Membership function? Explain some types of membership function. 10 CO3PO2
d. Find the height of the following fuzzy set and also find α-cut of the set.(α=0.5) Ȧ={0.1/a, 0.6/b, 0.4/c, 0.8/d, 0.5/e} 5 CO3PO2

6. a. Explain Roulette-wheel selection methods for selecting chromosomes. 10 CO3PO2
b. What is Fitness function? 5 CO3PO2

(OR)

c. Explain different crossover schemes with example. 10 CO4PO2
d. What is search space ? Explain with example. 5 CO4PO3

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