

Paper Id: 110722

Roll No:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

B. TECH
(SEM-VII) THEORY EXAMINATION 2019-20
APPLICATION OF SOFT COMPUTING

Time: 3 Hours

Total Marks: 70

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief.

2 x 7 = 14

- a. How AI can be used in neural network? Give proper justification.
- b. Differentiate the soft computing and hard computing.
- c. Draw biological neural network and explain each part.
- d. What is fuzzy quantifier?
- e. Use the Hebb rule to store the vector $[1 \ -1 \ 1 \ -1]$ in an auto-associative neural network.
- f. Explain convergence in genetic algorithm.
- g. Explain conditional and unconditional fuzzy proposition.

SECTION B

2. Attempt any three of the following:

7 x 3 = 21

- a. Implement MADALINE network to solve XOR problem.
- b. Explain generational cycle of GA with diagram.
- c. Discuss the selection of various parameters in BPN.
- d. Explain the Greg Voit's Fuzzy Cruise Controller.
- e. For the given input vectors $S = (S_1, S_2, S_3, S_4)$ and output vector $T = (T_1, T_2)$, find the weight matrix using hetero associative training algorithm.
 $S = (S_1, S_2, S_3, S_4) \quad T = (T_1, T_2)$
 I (1, 1, 0, 0) (0, 1)
 II (1, 0, 0, 1) (1, 1)
 III (1, 1, 0, 0) (1, 0)
 IV (0, 1, 0, 1) (0, 0)

SECTION C

3. Attempt any one part of the following:

7 x 1 = 7

- (a) What is simulated annealing? Explain the structure the simulated annealing algorithm.
- (b) Consider four destination wedding packages P1, P2, P3 and P4. We want to choose one. Their cost are INR 1,00,000, INR 1,50,000, INR 2,50,000 and INR 3,50,000. Their days for packages are 10, 20, 30 and 35 respectively. They are viewed as interesting with degrees 0.4, 0.3, 0.6, 0.5. Define your own Fuzzy set of acceptable days of packages. Then determine the Fuzzy set of interesting wedding packages whose cost and days for package are acceptable and use this set to choose one of your package.

4. Attempt any one part of the following:

7 x 1 = 7

- (a) Write the expression of bipolar continuous and bipolar binary activation function.
- (b) Discuss the applications of GA in detail.

Paper Id:

110722

Roll No:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

5. Attempt any *one* part of the following:

7 x 1 = 7

- (a) Discuss the membership function and state its importance in fuzzy logic. Also discuss the features of membership functions.
- (b) Write short note on genetic representation.

6. Attempt any *one* part of the following:

7 x 1 = 7

- (a) Explain back propagation algorithm and factors that may affect the Back propagation neural network.
- (b) Explain fuzzy relations and fuzzy to crisp conversion in detail.

7. Attempt any *one* part of the following:

7 x 1 = 7

- (a) Explain mutation and mutation rate with example.
- (b) Write short note on the following:
 - i. Hopfield Network
 - ii. Supervised learning and Unsupervised learning

MANISH KUMAR JHA
11-Dec-2019 13:33:32 | 117.55.242.131



Roll No:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

B. TECH
(SEM-V) THEORY EXAMINATION 2020-21
APPLICATION OF SOFT COMPUTING

Time: 3 Hours**Total Marks: 100****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief.****2 x 10 = 20**

Q no.	Question	Marks	CO
a.	Show the importance of fuzzy sets over classical sets.	2	3
b.	Identify the necessity of bias in neural network.	2	1
c.	Consider set $X = \{2, 4, 6, 8, 10\}$. Find its power set, cardinality, and cardinality of power set.	2	3
d.	Define time dependent fuzzy logic.	2	3
e.	Differentiate between soft computing and hard computing.	2	1
f.	Justify how rank selection method is different from roulette wheel selection method?	2	5
g.	Discuss the impact of weight in ANN.	2	2
h.	Differentiate between supervised and unsupervised learning.	2	1
i.	Differentiate between absolute and relative Quantifier.	2	4
j.	Analyze how convergence of GA is achieved.	2	5

SECTION B**2. Attempt any three of the following:****3 x 10 = 30**

Q no.	Question	Marks	CO
a.	Describe multilayer perceptron model. Does perceptron require supervised learning? If no, what does it require? Support your answer.	10	1
b.	Explain Generation cycle. What are the different applications of Genetic Algorithm?	10	5
c.	Draw the architecture of back propagation algorithm. State the importance of Back propagation algorithm.	10	2
d.	Illustrate various defuzzification methods in details.	10	4
e.	Discuss in detail how crisp logic is different from fuzzy logic.	10	3

SECTION C**3. Attempt any one part of the following:**

Q no.	Question	Marks	CO
a.	Apply Hebb rule method to develop logical AND function (take bipolar inputs and targets).	10	1
b.	Differentiate between recurrent network and multilayer feed forward network.	10	1

4. Attempt any one part of the following:

Q no.	Question	Marks	CO
a.	Illustrate Multilayer perceptron model in detail. Compare feed-forward and feedback networks.	10	2
b.	Draw the architecture of back propagation algorithm. State the importance of Back propagation algorithm.	10	2



Roll No:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

5. Attempt any *one* part of the following:

Q no.	Question	Mark s	C O																														
a.	<p>Consider fuzzy relations:</p> <table><tr><td></td><td>Y1</td><td>Y2</td><td></td><td>Z1</td><td>Z2</td></tr><tr><td>R=</td><td>X1</td><td>0.3</td><td>0.2</td><td>S=</td><td>Y1</td><td>0.6</td><td>0.1</td></tr><tr><td></td><td>X2</td><td>0.5</td><td>0.8</td><td></td><td>Y2</td><td>0.3</td><td>0.5</td></tr><tr><td></td><td>X3</td><td>0.7</td><td>0.4</td><td></td><td></td><td></td><td></td></tr></table> <p>Find T=RoS</p> <p>a. Using max-min composition</p> <p>b. Using max-product composition</p> <p>Using max-average composition</p>		Y1	Y2		Z1	Z2	R=	X1	0.3	0.2	S=	Y1	0.6	0.1		X2	0.5	0.8		Y2	0.3	0.5		X3	0.7	0.4					10	3
	Y1	Y2		Z1	Z2																												
R=	X1	0.3	0.2	S=	Y1	0.6	0.1																										
	X2	0.5	0.8		Y2	0.3	0.5																										
	X3	0.7	0.4																														
b.	Discuss Fuzzification? Explain any three methods of fuzzification in detail.	10	3																														

6. Attempt any *one* part of the following:

Q no.	Question	Marks	CO																					
a.	<p>We want to compare two liquid level controllers for their control levels and flow Speed. The following values of flow speed and liquid control levels were recorded.</p> <table><tr><td>Flow speed(X):</td><td>0</td><td>20</td><td>40</td><td>60</td><td>80</td><td>100</td></tr><tr><td>Level1 (L1):</td><td>0</td><td>0.5</td><td>0.35</td><td>0.75</td><td>0.95</td><td>1.0</td></tr><tr><td>Level (L2):</td><td>0</td><td>0.45</td><td>0.55</td><td>0.65</td><td>0.9</td><td>1.0</td></tr></table> <p>Show the output of the following:</p> <p>(a) $\mu_{L1} \cup L2(x)$ (b) $\mu_{L1} \cap L2(x)$ (c) $\mu_{L1}^c(x)$ (d) $\mu_{L2}^c(x)$</p> <p>(e) $\mu_{L1}^c \cup L2^c(x)$ (f) $\mu_{L1}^c \cap L2^c(x)$ (g) $\mu_{L1}^c \cap L2(x)$</p> <p>(h) $\mu_{L1} \cup L2^c(x)$ (i) $\mu_{L1} \cup L1^c(x)$</p>	Flow speed(X):	0	20	40	60	80	100	Level1 (L1):	0	0.5	0.35	0.75	0.95	1.0	Level (L2):	0	0.45	0.55	0.65	0.9	1.0	10	4
Flow speed(X):	0	20	40	60	80	100																		
Level1 (L1):	0	0.5	0.35	0.75	0.95	1.0																		
Level (L2):	0	0.45	0.55	0.65	0.9	1.0																		
b.	With a neat block diagram explain the architecture of a fuzzy logic controller.	10	4																					

7. Attempt any *one* part of the following:

Q no.	Question	Marks	CO
a.	Explain various operators involved in Genetic Algorithm. What are the various types of crossover and mutation techniques? Create an example to show these operators.	10	5
b.	Design and discuss the flowchart of GA. How Genetic algorithms are very different from most of the traditional optimization methods?	10	5



PAPER ID-410933

Printed Page: 1 of 1
Subject Code: KCS056

Roll No:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

B.TECH
(SEM V) THEORY EXAMINATION 2021-22
APPLICATION OF SOFT COMPUTING

Time: 3 Hours**Total Marks: 100****Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions.**2X10=20**

- a. Define Soft Computing. How is it different from conventional computing?
- b. What is difference between auto associative memory and hetero associative Memory?
- c. Write down the applications of genetic algorithm.
- d. What is a self organizing map?
- e. What is a membership function in a fuzzy set?
- f. If $\underline{A} = \{1/1, 0.7/1.5, 0.2/2, 0.6/2.5\}$ and $\underline{B} = \{0.2/1, 0.3/1.5, 0.7/2, 0.1/2.5\}$ find the Algebraic sum of the given fuzzy sets.
- g. What are the basic components of ANN?
- h. What is meant by threshold logic unit?
- i. Why do we use bias function in neural network?
- j. What is Adaptive learning?

SECTION B

2. Attempt any three parts of the following:**10X3=30**

- a. How crossover used in a GA? Explain the types of crossover with example.
- b. How is weight adjustment done in back propagation network?
- c. What is Defuzzification? Explain all the three methods which are used in Defuzzification with an example?
- d. What is Multilayer perceptron? How is different from single layer perceptron?
- e. Discuss neuro fuzzy system and rule base structure identification in detail.

SECTION C

3. Attempt any one part of the following:**10X1=10**

- (a) How back propagation network works in ANN? Write an algorithm for it.
- (b) Explain supervised and unsupervised learning in detail.

4. Attempt any one part of the following:**10X1=10**

- (a) Why perceptron is not able to handle the tasks which are not linearly separable? Justify your answer using XOR Problem.
- (b) Write a short notes on the following:
 - (i) Feedback control system
 - (ii) Fuzzy Automata

5. Attempt any one part of the following:**10X1=10**

- (a) Explain the architecture of Kohonen self organizing network.
- (b) Explain Fuzzy Inference System with all its components in detail.

6. Attempt any one part of the following:**10X1=10**

- (a) How can Fitness functions be found for any optimization problem? Maximize the function $f(x)=x^2$, with x in the integer interval $[0,31)$ with the help of Genetic Algorithm.
- (b) What is Genetic Algorithm? Discuss the working of Genetic Algorithm with the help of flowchart.

7. Attempt any one part of the following:**10X1=10**

- (a) What are fuzzy sets? Discuss the various properties of fuzzy sets?
- (b) Write short note on the following:
 - (i) Fuzzy Controllers
 - (ii) Fuzzy and Crisp relations

B.TECH
(SEM V) THEORY EXAMINATION 2022-23
APPLICATION OF SOFT COMPUTING

Time: 3 Hours**Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

- 1. Attempt all questions in brief.** **2 x 10 = 20**
- (a) What does convergence mean in neural networks?
 - (b) Write down applications of Associative Memory.
 - (c) What are the limitations of backpropagation algorithm?
 - (d) Define Perceptron model.
 - (e) What is fuzzy logic used for?
 - (f) What are the operations of crisp set?
 - (g) Where is fuzzy controller used?
 - (h) Define Fuzzification.
 - (i) Give few applications of genetic algorithm.
 - (j) What are different operators in GA?

SECTION B

- 2. Attempt any three of the following:** **10x3 = 30**
- (a) Write short notes on recurrent auto associative memory & explain its pros & cons.
 - (b) How does Multilayer Perceptron work? What are the main problems with the back propagation learning algorithm?
 - (c) Explain the different types of Operation used in Fuzzy Set with suitable examples.
 - (d) Why is Defuzzification necessary? Explain different types of Defuzzification with suitable example.
 - (e) State and explain the different selection methods in GA.

SECTION C

- 3. Attempt any one part of the following:** **10x1 = 10**
- (a) What is an artificial neural network and explain its layer?
 - (b) What is the synapse of a neuron? Draw and explain structure of a neuron.
- 4. Attempt any one part of the following:** **10x1 = 10**
- (a) What is single layer artificial neural network? What is a Perceptron model?
 - (b) What is back propagation algorithm explain with example?
- 5. Attempt any one part of the following:** **10x1 = 10**
- (a) Explain fuzzy relationship. What is the difference between fuzzy logic and crisp logic?
 - (b) What are the basic components of a fuzzy logic system? Explain.
- 6. Attempt any one part of the following:** **10x1 = 10**
- (a) What are the industrial applications of fuzzy logic?
 - (b) What is fuzzy implication? What is fuzzy controller explain with real life example?
- 7. Attempt any one part of the following:** **10x1 = 10**
- (a) What is two point crossover and uniform crossover in genetic algorithm?
 - (b) What is Genetic Algorithm? Explain the procedures of GA.