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**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 is 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

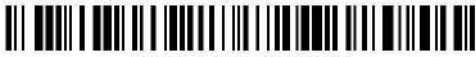
**SECTION C**

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



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

Q no.	Question	Mark s	C O
a.	Consider fuzzy relations: $R = \begin{matrix} & Y1 & Y2 \\ X1 & 0.3 & 0.2 \\ X2 & 0.5 & 0.8 \\ X3 & 0.7 & 0.4 \end{matrix}$ $S = \begin{matrix} & Z1 & Z2 \\ Y1 & 0.6 & 0.1 \\ Y2 & 0.3 & 0.5 \end{matrix}$ Find $T = R \circ S$ a. Using max-min composition b. Using max-product composition Using max-average composition	10	3
b.	Discuss Fuzzification? Explain any three methods of fuzzification in detail.	10	3

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

Q no.	Question	Mark s	C O
a.	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. $\begin{matrix} \text{Flow speed}(X): & 0 & 20 & 40 & 60 & 80 & 100 \\ \text{Level1 (L1):} & 0 & 0.5 & 0.35 & 0.75 & 0.95 & 1.0 \\ \text{Level (L2):} & 0 & 0.45 & 0.55 & 0.65 & 0.9 & 1.0 \end{matrix}$ Show the output of the following: (a) $\mu_{L1} \cup L2(x)$ (b) $\mu_{L1} \cap L2(x)$ (c) $\mu_{L1^c}(x)$ (d) $\mu_{L2^c}(x)$ (e) $\mu_{L1^c} \cup L2^c(x)$ (f) $\mu_{L1^c} \cap L2^c(x)$ (g) $\mu_{L1^c} \cap L2(x)$ (h) $\mu_{L1} \cup L2^c(x)$ (i) $\mu_{L1} \cup L1^c(x)$	10	4
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	Mark s	C O
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