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**B.TECH**  
**(SEM VII) THEORY EXAMINATION 2021-22**  
**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.****2X7 =14**

- a. What is the necessity of activation functions?
- b. What is an artificial neuron?
- c. Explain the difference between Fuzzy logic and Crisp Logic.
- d. What is Fuzzy Cartesian Product?
- e. Fuzzy Set  $A = \{(x_1, 0.2), (x_2, 0.9), (x_3, 0.4)\}$  and Fuzzy Set  $B = \{(x_1, 0.4), (x_2, 0.5), (x_3, 0.2)\}$  find disjunctive sum of Fuzzy Set A and B.
- f. Write down the various applications of fuzzy logic.
- g. What are the advantages of Genetic Algorithm over conventional algorithms.

**SECTION B**

**2. Attempt any three of the following:****7X3 = 21**

- a. What is soft computing? Compare and contrast between soft computing and hard computing.
- b. Define an artificial neural network. Discuss the various characteristics of an artificial neural network in detail.
- c. Discuss in details operations and properties of fuzzy sets. Why law of contradiction and law of exclusive middle are violated in fuzzy set theory under the standard fuzzy set operations.
- d. Draw and explain multiple perceptron with its learning algorithm.
- e. What is Genetic Algorithm? Discuss the various genetic operators in detail.

**SECTION C**

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

- a. What is Fuzzy system? Explain fuzzification. Design a Fuzzy Cruise controller or Air conditioner controller and demonstrate its working. Make the assumptions of values as per your requirement.
- b. Explain Self Organizing Map and its training algorithms in detail.

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

- a. What is fuzzy quantifier? Difference between absolute and relative quantifiers.
- b. What is Defuzzification? Explain all the three methods which are used in Defuzzification with an example?

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

- a. What are the various internet search techniques based on genetic algorithms?
- b. Explain the roulette wheel selection in detail.

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

- a. Discuss rule base structure identification and simulated annealing in detail.
- b. How is fuzzy relation converted into a crisp relation using lambda-cut process?

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

- a. Explain the difference between the randomness and fuzziness. Also discuss why we need fuzzy set theory.
- b. Write short note on the following:
  - (i) Supervised and Unsupervised learning
  - (ii) Recurrent Networks