# GUJARAT TECHNOLOGICAL UNIVERSITY
## BE - SEMESTER–VI(NEW) EXAMINATION – WINTER 2022

**Subject Code:3160619**                          **Date:15-12-2022**
**Subject Name:Soft Computing Techniques**
**Time:02:30 PM TO 05:00 PM**                    **Total Marks:70**
**Instructions:**
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

|  |  |  | MARKS |
|---|---|---|---|
| **Q.1** | **(a)** | Distinguish between hard and soft computing | **03** |
|  | **(b)** | Define soft computing. Mention the applications of soft computing | **04** |
|  | **(c)** | Define defuzzification. Illustrate various types of defuzzification techniques | **07** |
|  |  |  |  |
| **Q.2** | **(a)** | With the help of a figure, explain the features of fuzzy membership functions | **03** |
|  | **(b)** | Discuss the characteristics of soft computing | **04** |
|  | **(c)** | With the help of a block diagram, explain a fuzzy rule-based system | **07** |
|  |  | **OR** |  |
|  | **(c)** | Write a note on fuzzy implications and interferences | **07** |
|  |  |  |  |
| **Q.3** | **(a)** | Mention the role of fitness function in genetic algorithm | **03** |
|  | **(b)** | Represent the standard fuzzy set operations using venn diagram | **04** |
|  | **(c)** | Briefly describe various crossover techniques employed in genetic algorithm | **07** |
|  |  | **OR** |  |
| **Q.3** | **(a)** | State the concept of delta rule used in adaptive linear neurons | **03** |
|  | **(b)** | Compare between biological neural network and artificial neural network | **04** |
|  | **(c)** | Explain convergence of genetic algorithm | **07** |
|  |  |  |  |
| **Q.4** | **(a)** | Compare supervised and unsupervised learning approaches in ANN learning | **03** |
|  | **(b)** | Write drawbacks of genetic algorithm | **04** |
|  | **(c)** | What is GA? With a neat flowchart, explain the operation of a simple GA | **07** |
|  |  | **OR** |  |
| **Q.4** | **(a)** | Explain the terms: Chromosome, crossover, mutation | **03** |
|  | **(b)** | Explain different neural network architecture | **04** |
|  | **(c)** | Explain how GA used for weight optimization in neural network | **07** |
|  |  |  |  |
| **Q.5** | **(a)** | Give a few basic topological structures of ANN | **03** |
|  | **(b)** | Explain the concept of genetic-fuzzy systems | **04** |
|  | **(c)** | Explain the concept of simulation of biological neurons to problem solving | **07** |
|  |  | **OR** |  |
| **Q.5** | **(a)** | Give the advantages of neuro-genetic hybrids | **03** |
|  | **(b)** | Write the applications of fuzzy-neural systems | **04** |

**(c)** What are the classifications of neuro-fuzzy hybrid systems? Discuss in detail    **07**

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