



M.Sc. IV Semester Degree Examination, Sept./Oct. - 2024

COMPUTER SCIENCE

Soft Computing

(NEP)

Time : 3 Hours

Maximum Marks : 70

Note : Answer **any five** of the following questions with **Question No.1 (Q1) Compulsory**, each question carries **equal** marks.

1. (a) What are the key differences between Supervised and Unsupervised Learning ? **7**
(b) Characterize the Constituents of Soft Computing. **7**
2. (a) Explain the Backpropagation Neural Network. What are its key steps, and how does it facilitate the training of neural networks ? **7**
(b) Describe Learning Vector Quantization (LVQ) and its role as an adaptive data classification method. **7**
3. (a) For a given set : **7**
 $A = \{0.2/a, 0.4/b, 1/c, 0.8/d, 0/e\}$
 $B = \{0/a, 0.9/b, 0.3/c, 0.2/d, 0.1/e\}$
Calculate the following :
(i) Support, Core, Cardinality, and Complement for A and B independently,
(ii) Union and Intersection of A and B,
(iii) The new set $C = A^2$
(iv) The new set $D = 0.5 \times D$
(v) The new set E, which is the alpha cut at $A_{0.5}$
(b) Describe membership functions in the context of fuzzy logic. **7**
4. (a) Outline the basic structure and steps of a Genetic Algorithm. Provide a detailed flowchart illustrating the key stages of the algorithm. **7**
(b) What is encoding in Genetic Algorithms ? Describe the various encoding schemes, and explain how each scheme is used to represent solutions. **7**
5. (a) What are the key characteristics and types of Neuro-Fuzzy Systems ? **7**
(b) What is fuzzy number, and how is it used in fuzzy logic systems ? **7**



6. (a) Discuss the architecture and key components of Hamming Neural Network. **7**
(b) What is defuzzification and why is it an essential process in fuzzy logic systems ? **7**
7. (a) How are biological terms used to describe various components of a Genetic Algorithm ? **7**
(b) How do we use Genetic Algorithms to optimize the parameters ? **7**
8. Write Short Notes on the following : **5+5+4**
(a) Fuzzification
(b) Linguistic Variables and Values
(c) Fuzzy ArtMap

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