Reg.No.:												

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 13011

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – MAY / JUNE 2024
Sixth Semester
Computer Science and Technology
U19CTV36 - NEURO FUZZY AND GENETIC PROGRAMMING
(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Outline is the role of activation functions in artificial neural networks?	2	K2	CO1
2.	What is a Hebbian network?	2	K1	CO1
3.	What is Bidirectional Associative Memory (BAM) in neural networks?	2	K1	CO2
4.	Demonstrate an example of pattern association in a real-world scenario.	2	K2	CO2
5.	How are operations like union and intersection performed on crisp sets?	2	K2	CO3
6.	List the basic operations performed on fuzzy sets?	2	K1	CO3
7.	What is aggregation in the context of fuzzy logic systems?	2	K1	CO4
8.	Demonstration example showing the use of fuzzy propositions in practical applications.	2	K4	CO4
9.	Explain historical milestones in the development of evolutionary computing?	2	K1	CO5
10.	What is the purpose of the fitness function in a genetic algorithm?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	How did artificial neural networks (ANNs) originate and evolve over time? Discuss the historical milestones in the development of ANN architectures and learning algorithms.	7	K1	CO1
		ii.	Describe the evolution of learning algorithms used in ANNs. Provide examples of real-world applications where ANN architectures and learning algorithms have been successfully applied.	6	K3	CO1
			(OR)			
	b)	i.	How are ADALINE and MADALINE networks trained and used for pattern recognition tasks? Give examples of real-world applications where ADALINE and MADALINE networks have been successfully applied.	6	K1	CO1
		ii.	Discuss techniques for addressing the linear separability problem in neural networks. Provide examples illustrating the application of these techniques in solving classification problems.	7	K2	CO1
12.	a)	i.	Explain the concept of a radial basis function in neural network architecture. How does the Radial Basis Function (RBF) address the local minima problem?	6	K1	CO2
		ii.	What is Adaptive Resonance Theory (ART) in neural networks? How does ART differ from other neural network models? Explain the practical applications of the Delta Rule in neural network training.	7	K2	CO2
			(OR)			
	b)	i.	Outline the steps involved in the backpropagation algorithm? How does backpropagation help in training neural networks?	6	K3	CO2
		ii.	Explain the mathematical formulation of the Delta Rule. How does the Delta Rule adjust weights in a neural network?	7	K2	CO2
13.	a)	i.	Explain the concept of fuzzy sets in set theory. Discuss the advantages of using fuzzy sets in modeling uncertainty. How are membership functions used to define fuzzy sets?	7	K1	CO3

		ii.	What are the common types of fuzzy membership functions? Explain the concept of linguistic variables in fuzzy membership functions?	6	K2	CO3
			(OR)			
	b)	i.	How are composition, intersection, and union operations applied to fuzzy relations? Provide examples illustrating the use of fuzzy relations in modelling real-world relationships.	7	K1	CO3
		ii.	Discuss the concept of the fuzzy extension principle and its role in fuzzy logic. Explain how the fuzzy extension principle allows operations defined on crisp sets to be extended to fuzzy sets.	6	K2	CO3
14.	a)	i.	How are fuzzy rules evaluated in a fuzzy logic system? Discuss any challenges associated with the evaluation of fuzzy rules.	6	K2	CO4
		ii.	How do rule-based systems handle uncertainty and vagueness more effectively than conventional programs? Provide examples.	7	K3	CO4
			(OR)			
	b)	i.	Explain how fuzzy controllers adapt to changing environmental conditions and user preferences. Discuss any challenges associated with the implementation of fuzzy controllers in real-world systems.	7	K4	CO4
		ii.	Discuss the concept of defuzzification and its significance in converting fuzzy outputs into crisp values.	6	K3	CO4
15.	a)	i.	Describe the stages of a typical genetic algorithm cycle. What factors should be considered when designing an effective fitness function for a specific problem?	6	K2	CO5
		ii.	What are genetic algorithm operators and how are they used? Discuss the role of selection operators in genetic algorithms.	7	K2	CO5
			(OR)			
	b)	i.	What is the schema theorem in the context of genetic algorithms? Provide an example illustrating the concept of schemas in genetic algorithms.	6	K1	CO5
		ii.	How are genetic algorithms applied to solve optimization and search problems?	7	K1	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	Explain the concept of crisp sets in set theory. Illustrate the application of crisp sets in real-world scenarios? Describe the relationship between crisp sets and other set theories fuzzy sets and rough sets.	8	K2	CO3
	ii.	Explain how can the application of genetic algorithms be optimized or improved through the careful selection and tuning of genetic operators?	7	K4	CO5
		(OR)			
b)	i.	What are Holland classifier systems and how do they work? Discuss the key components and principles of Holland classifier systems. Provide examples illustrating the application of Holland classifier systems in real-world problems.	8	K1	CO2
	ii.	Describe the representation of solutions in genetic programming. What are some challenges associated with data representation in genetic programming, and how are they addressed?	7	K2	CO5
