Reg. No.															

Question Paper Code	13905

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Seventh Semester

Electronics and Instrumentation Engineering

(Common to Instrumentation and Control Engineering)

20EIEL701 - APPLIED SOFT COMPUTING TECHNIQUES

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	One of the following is a supervised learning algorithm? (a) K-means (b) Back propagation (c) SOM (d) Hebbian learning	1	K1	CO1
2.	The following is not a type of learning in ANN? (a) Supervised (b) Unsupervised (c) Reinforced (d) Heuristic	1	K1	CO1
3.	Find network uses feedback connections? (a) Feed forward (b) Recurrent (c) Radial basis (d) Modular	1	K1	CO2
4.	Hopfield networks are mainly used for ___ (a) Classification (b) Optimization (c) Memory storage (d) Prediction	1	K2	CO2
5.	Fuzzification is the process of converting ___ (a) fuzzy to crisp (b) crisp to fuzzy (c) set to subset (d) binary to analog	1	K1	CO3
6.	Which function defines the shape of fuzzy sets? (a) Transfer function (b) Membership function (c) Activation function (d) Cost function	1	K1	CO3
7.	Defuzzification converts fuzzy results into ___ (a) numerical output (b) linguistic output (c) binary output (d) membership degree	1	K2	CO4
8.	Which of the following is a real-time fuzzy control application? (a) Home heating (b) Text processing (c) Data encryption (d) Image enhancement	1	K1	CO4
9.	Crossover and mutation are key operators in ___ (a) Fuzzy logic (b) ANN (c) Genetic Algorithm (d) Tabu search	1	K2	CO5
10.	One of the following is a population-based optimization method? (a) Gradient descent (b) Simulated annealing (c) Genetic algorithm (d) Linear regression	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Differentiate supervised and unsupervised learning.	2	K2	CO1
12.	Extend the structure and operation of a biological neuron.	2	K2	CO1
13.	Infer the operation of Hopfield network.	2	K2	CO2
14.	List any two applications of ANN in process control.	2	K1	CO2
15.	Define fuzzy set and classical set with examples.	2	K1	CO3
16.	Summarize the concept of fuzzification and defuzzification.	2	K2	CO3
17.	Write short notes on fuzzy PID control.	2	K1	CO4
18.	Mention two advantages of fuzzy logic control.	2	K1	CO4
19.	Outline genetic algorithm and its main components.	2	K2	CO5
20.	List the advantages of genetic algorithms over traditional optimization.	2	K1	CO5
21.	Write a note on ant colony optimization technique.	2	K1	CO6

22.		Rephrase the basic flow of genetic algorithm.	*2*	*K2*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a) i)	Construct the architecture of multilayer feedforward neural network.	*05*	*K3*	*CO1*
	ii)	Develop the back propagation learning algorithm.	*06*	*K3*	*CO1*
		OR			
	b) i)	Experiment different learning strategies in neural networks.	*05*	*K3*	*CO1*
	ii)	Model the supervised learning process with an example.	*06*	*K3*	*CO1*
24.	a)	Build the function of Hopfield network and its stability conditions.	*11*	*K3*	*CO2*
		OR			
	b)	Identify the concept of feedback network with applications in control systems.	*11*	*K3*	*CO2*
25.	a)	Describe fuzzy sets, fuzzy relations, and membership functions with examples.	*11*	*K2*	*CO3*
		OR			
	b)	Compare fuzzy systems with crisp systems.	*11*	*K2*	*CO3*
26.	a)	Draw the design and working of a fuzzy logic controller for liquid level control.	*11*	*K3*	*CO4*
		OR			
	b)	Develop fuzzy PID control and its advantages in industrial systems.	*11*	*K3*	*CO4*
27.	a)	Explain the basic steps in genetic algorithm with flowchart.	*11*	*K2*	*CO5*
		OR			
	b)	Illustrate the working of GA in solving optimization problems.	*11*	*K2*	*CO5*
28.	a)	Discuss hybrid optimization methods combining GA and fuzzy systems.	*11*	*K2*	*CO5*
		OR			
	b)	Explain the role of tabu search and ant colony optimization in soft computing.	*11*	*K2*	*CO5*