Code: 19EE4801A

IV B.Tech - II Semester – Regular Examinations – MAY 2023

ARTIFICIAL INTELLIGENCE APPLICATION TO POWER SYSTEMS
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours   Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
   2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.
   3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.
   4. All parts of Question paper must be answered in one place.

BL – Blooms Level   CO – Course Outcome

PART – A

		BL	CO
1. a)	What is the role of fuzzy inference system?	L2	CO1
1. b)	Define the term Artificial Neural Network (ANN).	L2	CO1
1. c)	What is the purpose of elitism operator in Genetic Algorithm (GA)?	L2	CO1
1. d)	Write particle velocity calculation equation in PSO.	L2	CO1
1. e)	Define load forecasting.	L2	CO1

PART – B

			BL	CO	Max. Marks
		UNIT-I			
2	a)	Explain any three types of membership function used in Fuzzy Logic System with a suitable sketch and mathematical equation.	L2	CO1	6 M

	b)	Two fuzzy sets are given as
		  A = {(x1, 0.1), (x2, 0.2), (x3, 0.3), (x4, 0.4)}
		  B = {(x1, 0.5), (x2, 0.7), (x3, 0.8), (x4, 0.9)}
		Compute the following
		 i) Algebraic product of A and B
		 ii) Union of A and B
		 iii) Multiplication of Fuzzy set A by crisp number 0.2
		 iv) Bounded sum of A and B
			L4	CO2	6 M

		OR			
3	a)	Discuss any two defuzzification methods in brief which can be used in fuzzy logic.	L2	CO1	6 M
	b)	Explain Fuzzy rule base by considering suitable example.	L4	CO2	6 M
		UNIT-II			
4	a)	Explain supervised learning with suitable example.	L4	CO2	6 M

	b)	What is Functional Link Network? Discuss its training algorithm.	L2	CO1	6 M
OR					
5	a)	Classify the Artificial neural networks based on their architecture and explain them in detail.	L4	CO2	6 M
	b)	Discuss the following in brief i)Modular network ii)Neural network controller	L2	CO1	6 M

UNIT-III

6	a)	Explain clearly in what way Rank selection is different from Roulette wheel selection.	L4	CO3	6 M
	b)	Discuss the concept of Multi Point Crossover with a suitable example.	L2	CO3	6 M
OR					
7	a)	Illustrate the importance of mutation operator and also explain how it can influence the convergence characteristics of Genetic Algorithm (GA).	L4	CO3	6 M
	b)	What is fitness function and how it is selected? Also explain is genetic algorithm suitable for maximization or minimization problem.	L4	CO3	6 M

UNIT-IV

8	a)	Discuss Particle Swarm Optimization (PSO) algorithm implementation steps with suitable equations.	L2	CO1	6 M

	b)	What do you mean by Pbest and Gbest in PSO explain in detail.	L4	CO3	6 M
		OR			
9	a)	In what way PSO is better than GA? Explain in detail.	L2	CO1	6 M
	b)	Articulate how PSO method can be used to improve the performance in power systems.	L3	CO3	6 M
		UNIT-V			
10	a)	Illustrate that Load flow study application can be addressed by Artificial Intelligence (AI) techniques.	L3	CO4	6 M
	b)	How can an Artificial Neural Network be applied for speed control of ac motor? Explain in detail.	L3	CO4	6 M
		OR			
11	a)	How can an Artificial Neural Network be applied for reactive power control? Explain in detail.	L3	CO4	6 M
	b)	Illustrate in detail how fuzzy logic can be employed in Load Frequency Control application?	L3	CO4	6 M