Marking Scheme
IT3EA03 Soft Computing (SC) (AI Track)

Q.1	i)	Reproduction and crossover are the steps to perform optimization in …..... (d) Genetic Algorithm	**1**
	ii)	Who initiated the idea of Soft Computing? (a)Lofti A Zadeh	**1**
	iii)	The learning rule followed in Madaline net is (c) Delta	**1**
	iv)	A neuron with 3 inputs has the weight vector [0.2 -0.1 0.1] and a bias θ = 0. If the input vector is X = [0.2 0.4 0.2] then the total input to the neuron and if binary activation function is used then actual output is (b) 0.02,1	**1**
	v)	…..... is not a defuzzification method (a) Mamdani Method	**1**
	vi)	Generalized Modus Tollens is defined as (b)If x is A Then y is B, given x is B^-, then y is A^-	**1**
	vii)	Individuals from the mating pool are used to generate new …..... (c) Offspring	**1**
	viii)	In roulette Wheel Selection, each individual is assigned a segment of roulette wheel whose size is proportional to the value of the…..... of the individual (d) Fitness	**1**
	ix)	…..... System providesan optimized solution for any kind of learning (b) Neuro-Genetic	**1**
	x)	All 3 neural network, fuzzy and genetic algorithm are part of soft computing because (d) In each, no precise mathematical model of the problem is required	**1**
Q.2	i.	Definition of soft computing 1.5 marks characteristics 1.5 marks.	**3**
	ii.	7 differences each 1 mark	**7**
OR	iii.	4 applications each 1.25 marks each.	**7**
Q.3	i.	6 comparisons, 0.5 mark each.	**3**
	ii.	AND gate implementation with all parameters required 7 marks.	**7**
OR	iii.	Supervised and Unsupervised learning with example 4 marks Reinforcement learning 2 marks.	**7**
Q.4	i.	Any two Fuzzy set operations 2.5 mark each.	**5**
	ii.	De -fuzzification 1 mark Any TWO De -fuzzification techniques 2 marks for each (2 marks * 2) 4 marks	**5**
OR	iii.		**5**
Q.5	i.	Genetic algorithm definition 1 mark, 2 applications with explanation 2 marks each.	**5**
	ii.	'Roulette Wheel Selection'	**5**
OR	iii.	1 mark for each operator explanation.	**5**
Q.6		Attempt any two:	
	i.	Types of Neuro-Fuzzy system 2 marks Any one architecture with diagram 3 marks	**5**
	ii.	genetic algorithm-based backpropagation network definition 2 marks explanation 3 marks	**5**
	iii.	Hybrid intelligent control system 2 marks Advantages and disadvantages of Fuzzy control system 3 marks	**5**

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Q.6		Attempt any two:					
	i.	What are the different types of Neuro-Fuzzy system? Explain any one architecture in detail with the help of diagram.	**5**	1	4	1	1
	ii.	Explain genetic algorithm-based backpropagation network.	**5**	2	5	2	2
	iii.	What is hybrid intelligent control system? What are the advantages and disadvantages of Fuzzy control system.	**5**	1	4	1	2,3

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Engineering
End Sem Examination Dec 2024
IT3EA03 Soft Computing

Programme: B.Tech. Branch/Specialisation: IT

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	**BL**	**PO**	**CO**	**PSO**
Q.1	i.	Reproduction and crossover are the steps to perform optimization in …..... (a) Fuzzy Logic (b) Cloud Computing (c) Neural Network (d) Genetic Algorithm	**1**	1	1	1	1
	ii.	Who initiated the idea of soft computing? (a) Lofti A Zadeh (b) Mc_Culloch (c) Rechenberg (d) Charles Darwin	**1**	1	1	1	1
	iii.	The learning rule followed in Madaline network is- (a) Winner take all (b) Hebbian (c) Delta (d) Perceptron	**1**	1	2	2	1
	iv.	A neuron with 3 inputs has the weight vector [0.2 -0.1 0.1] and a bias θ = 0. If the input vector is X = [0.2 0.4 0.2] then the total input to the neuron and if binary activation function is used then actual output is (a) 1.0,1 (b) 0.02,1 (c) -1.0,0 (d) 0.20,1	**1**	2	2	2	2

v.	…..... is not a defuzzification method. (a) Mamdani Method (b) Sugeno Method (c) Maxima Method (d) Centroid Method	**1**	1	2	1	1
vi.	Generalized Modus Tollens is defined as- (a) If x is A Then y is B, given x is A^-, then y is B (b) If x is A Then y is B, given x is B^-, then y is A^- (c) If x is A Then y is B, given x is A, then y is B (d) None of these	**1**	2	2	2	1
vii.	Individuals from the mating pool are used to generate new …..... (a) Filtered out genes (b) Initial population (c) Offspring (d) None of these	**1**	1	1	2	1
viii.	In roulette wheel selection, each individual is assigned a segment of roulette wheel whose size is proportional to the value of the…..... of the individual (a) Membership value (b) Chromosome (c) Truthness (d) Fitness	**1**	1	1	3	2
ix.	…..... system provides an optimized solution for any kind of learning (a) Fuzzy-Genetic (b) Neuro-Genetic (c) Neuro-Fuzzy (d) None of these	**1**	1	1	3	2
x.	All 3 neural network, fuzzy and genetic algorithm are part of soft computing because (a) Artificial neural network and genetic algorithm gives accurate result but fuzzy logic does not (b) Fuzzy gives exact result but genetic algorithm and artificial neural network does not. (c) All gives precise and accurate results (d) In each, no precise mathematical model of the problem is required	**1**	2	2	3	2

Q.2	i.	Define soft computing and its characteristics.	**3**	1	1	2	1
	ii.	Differentiate between hard computing and soft computing.	**7**	1	1	1	1
OR	iii.	Explain any 4 applications of soft computing.	**7**	2	1	1	1
Q.3	i.	Compare ANN and BNN.	**3**	2	2	1,2	1,2
	ii.	Implement AND gate with Adaline network. Assume all the parameters required.	**7**	3	2	1,2	1
OR	iii.	Define Supervised and Unsupervised learning with example. Also explain Reinforcement learning.	**7**	2	1	1	1
Q.4		Attempt any two:					
	i.	Explain any two fuzzy set operations with example.	**5**	2	4	1	2
	ii.	Explain defuzzification method in detail. Name few defuzzification methods.	**5**	2	4	1	1
	iii.	Let X={a,b,c,d} and Y={1,2,3,4}, consider the fuzzy sets: A= {(a,0) (b,.8) (c,.6) (d,1)} B= {(1,.2) (2,1) (3,.8) (4,0)} C= {(1,0) (2,.4) (3,1) (4,.8)} Determine implication relation.	**5**	3	4	2	2,3
Q.5		Attempt any two:					
	i.	What is genetic algorithm? Discuss any two applications of genetic algorithm	**5**	1	4	1	1
	ii.	What is 'Roulette Wheel Selection'?	**5**	1	2	1	1
	iii.	Explain the following types of binary crossover operators with reference to genetic algorithm. (a) Single point crossover (b) Double point crossover (c) Multi point crossover (d) Uniform crossover (e) Matrix crossover	**5**	2	4	1,2	1