GURU NANAK INSTITUTE OF TECHNOLOGY
An Autonomous Institute under MAKAUT
2021
SOFT COMPUTING
EC803C

TIME ALLOTTED: 3 HOURS **FULL MARKS: 70**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

GROUP – A
(Multiple Choice Type Questions)

Answer any ***ten*** from the following, choosing the correct alternative of each question: **10×1=10**

			Marks	CO No
1.	(i)	Neural Networks are complex _____ with many parameters. a) Linear Function b) Nonlinear Functions c) Discrete Functions d) Exponential Functions	1	CO3
	(ii)	A fuzzy data with membership value 1.0 is called a) Crossover point b) Core c) Centre d) Both (b) and (c)	1	CO3
	(iii)	Mc-Culloch Pitts Model uses a) Tan hyperbolic function b) Signum function c) Step function d) Sigmoid function	1	CO1
	(iv)	Bayes rule is used to a) Increase the complexity b) Decrease the complexity c) Solve queries d) Answer probabilistic query	1	CO3
	(v)	Radial basis function uses a) Signum function b) Step function c) Sigmoid function d) Gaussian function	1	CO2
	(vi)	MADALINE stands for a) Many Adaptive Linear Neuron b) Many Additive Linear Neuron c) Many Associative Linear Neuron d) Many Adaptive Derivative Linear Neuron	1	CO1

(vii)	Which of the following belong to Hybrid soft computing? a) Fuzzy systems b) ANN systems c) GA systems d) Neuro-Fuzzy System		1	CO4
(viii)	A neural network has weights 5 and 10 having inputs 5 and 10 respectively. The transfer function is linear with constant of proportionality is 5.The output is a) 250 b) 50 c) 2500 d) 625		1	CO1
(ix)	Single layer Perceptron is used for a) Error Minimization b) Back Propagation c) Linear separability d) Annealing		1	CO1
(x)	Genetic Algorithm is used for a) optimization b) searching c) Adaptation d) Both (a) and (b)		1	CO4
(xi)	'Winner-takes- all' strategy is used in a) Competitive learning b) Hebbian learning c) Boltzmann learning d) Memory based learning		1	CO1
(xii)	Mark one of the features of Genetic Algorithm a) Fitness function b) Cross-over techniques c) Individuals among the population d) Random mutation		1	CO5

GROUP – B
(Short Answer Type Questions)

Answer any ***three*** from the following: **3×5=15**

			Marks	**CO No.**
2.		Explain Fuzzy membership functions with an example.	5	CO3
3.		What are the different Soft Computing techniques? Explain the difference between soft computing and hard computing.	5	CO1
4.	(a)	Explain the working of a self organizing map	3	CO1
	(b)	Compare Crisp and Fuzzy sets.	2	CO3
5.		Draw an ADALINE Network and explain its working.	5	CO2
6.		Explain mutation operator used in Genetic Algorithm.	5	CO4

GROUP – C
(Long Answer Type Questions)

Answer any ***three*** from the following: **3×15=45**

			Marks	CO No
7.	(a)	The Exclusive –OR function is not linearly separable. Explain it with two input binary and bipolar data.	5	CO1
	(b)	Design a multi-layer Perceptron network to solve XOR problem.	5	CO1
	(c)	Explain the difference between single layer perceptron and multi-layer perceptron with diagram.	5	CO1
8.	(a)	Discuss the advantages and limitations of Neuro-Genetic hybrids.	7	CO3
	(b)	Explain the Roulette wheel technique for traditional GA selection.	8	CO2
9.	(a)	Assume two fuzzy sets A and B of your choice. Find the difference (A-B) and disjunctive sum (AEX-OR B).	5	CO3
	(b)	Develop a Fuzzy Inference System model for controlling temperature in an air conditioner.	10	CO3
10.	(a)	Draw a flowchart for Genetic Algorithm and explain it. State some applications of GA.	9	CO4
	(b)	Explain the following terms with respect to GA: population, fitness function, Chromosomes.	6	CO4
11.		Write short notes on *any three* of the following:		
	(a)	Back-Propagation Network	5	CO2
	(b)	LMS algorithm	5	CO4
	(c)	Competitive learning	5	CO2
	(d)	Defuzzification	5	CO3
	(e)	ACO	5	CO5