Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (S, FE) / S5 (PT) (S,FE) Examination June 2024 (2015 Scheme)

Course Code: CS361

Course Name: SOFT COMPUTING

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

			Marks
1		List the commonly used activation functions. Define the necessity of activation functions	(3)
2		Define different learning methods in artificial neural network.	(3)
3		Define the Perceptron learning rule.	(3)
4		What is meant by excitatory and inhibitory weighted interconnections.	(3)

PART B

Answer any two full questions, each carries 9 marks.

5	a)	Obtain the net input for a network with inputs given as [x1, x2, x3] = [0.8, 0.6, 0.4] and the weights are [w1, w2, w3] = [0.1, 0.3, - 0.2] with bias = 0.35. Also find output for :i) Binary sigmoidal and ii) Bipolar sigmoidal	(5)
	b)	Implement OR function using MP neuron.	(4)
6	a)	Explain the training algorithm of perceptron network with AND function	(9)
7	a)	Explain the training algorithm of back-propagation network.	(5)
	b)	What is the role of Widrow-Hoff rule in Adaptive Linear neuron with proper equation?	(4)

PART C

Answer all questions, each carries 3 marks.

8		Fuzzy sets do not hold the law of contradiction and law of excluded middle. Justify with respect to crisp set.	(3)
9		Explain the features of membership functions.	(3)
10		For a fuzzy relation R.	(3)

$$R = \begin{bmatrix} 1 & 0.2 & 0.3 \\ 0.5 & 0.9 & 0.6 \\ 0.4 & 0.8 & 0.7 \end{bmatrix}$$

find the λ-cut relations for the following values $\lambda = 0.2$ and $\lambda = 0.9$

11 Define the method that uses max membership principle for defuzzification. (3)

PART D

Answer any two full questions, each carries 9 marks.

12 a) Differentiate the operation on fuzzy set and crisp sets with examples (5)

b) Explain any two methods of membership value assignment (4)

13 a) Using intuition and your own definition of the universe of discourse, plot fuzzy membership functions for the weight of the people: (5)

Very Thin, Thin, Average, Stout, Very Stout.

b) Explain the different types of fuzzy set. (4)

14 a) Compare any two defuzzification methods (5)

b) Given two fuzzy set: (4)

$\underline{A}$ = { (x_1, 0.2), (x_2, 0.5), (x_3, 0.6), (x_4, 0.8), (x_5, 1.0) }

$\underline{B}$ = { (x_1, 0.8), (x_2, 0.6), (x_3, 0.4), (x_4, 0.2), (x_5, 0.1) }

Perform union, intersection and complement operations.

PART E

Answer any four full questions, each carries 10 marks.

15 a) Explain about Mamdani fuzzy inference system and Tasaki Sugeno fuzzy inference system. (7)

b) Describe fuzzy rule formation (3)

16 a) Explain the methods used for decomposition of compound linguistic rules into simple canonical rules. (5)

b) Describe fuzzy aggregation of rules (5)

17 a) Explain Cooperative neural fuzzy system with diagram. (5)

b) Describe fuzzy propositions. (5)

18 a) Explain the operators in Genetic Algorithm (GA) with flow chart? (7)

b) Describe different mutation types in GA. (3)

19 a) Explain different types of encoding used to represent individual genes. (5)

b) Explain genetic neuro hybrid systems with diagram. (5)

20 a) Differentiate, any two selection techniques in GA with example. (5)

b) Describe the stopping conditions for GA. (5)

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