Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER–IV • EXAMINATION – WINTER 2016

Subject Code: 2640009 Date:26/10/ 2016

Subject Name: Soft Computing

Time:10.30 AM TO 01.00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Define the following terms: **07**

1. Weight
2. Crisp Relations
3. Mutation Operator
4. Artificial Neural Network
5. Hybrid Systems
6. Threshold
7. Learning Parameter

(b)

1. ANN is composed of large number of highly interconnected processing elements (neurons) working in unison to solve problems: a. True b. False **01**
2. Artificial neural network is used for: **01**
   a) Pattern Recognition
   b) Image Processing
   c) Clustering
   d) All of the above
3. Ability to learn how to do tasks based on the data given for training or initial experience is **01**
   a) Self Organization
   b) Adaptive learning
   c) Fault Tolerance
   d) Robustness
4. Why are linearly separable problems of interest of neural network researchers? **01**
   a) Because they are the only class of problem that network can solve successfully
   b) Because they are the only class of problem that Perceptron can solve successfully
   c) Because they are the only mathematical functions that are continue
   d) Because they are the only mathematical functions you can draw
5. Neural Networks are complex _____ with many parameters. **01**
   a) Linear Functions
   b) Nonlinear Functions
   c) Discrete Functions
   d) Exponential Functions
6. Which of the following types of learning can used for training artificial neural networks? **01**
   a) Supervised learning.
   b) Unsupervised learning.
   c) Reinforcement learning.
   d) All of the above answers.
   e) None of the above answers
7. A neural network can answer: **01**
   a) If – then – else type questions
   b) What – if questions
   c) For loop questions

d) None of the above

Q.2	**(a)**	Explain in brief the characteristics of MP model along with its architecture.	**07**
	(b)	Distinguish between the following: 1. Supervised Learning vs Unsupervised learning 2. Human brain vs Computers	**07**
		OR	
	(b)	Explain various activation functions. Explain any two ANN models with figure	**05** **02**
Q.3	**(a)**	Explain Hopfield networks.	**07**
	(b)	Explain Auto-Associative memories along with its architecture.	**07**
		OR	
Q.3	**(a)**	Solve the following input pattern using Hebb Rule: + + + + * + + * + + * + + + + + + + "O" "U" Target +1 Target -1	**07**
	(b)	Write a short note on Perceptron Networks with single output class.	**07**
Q.4	**(a)**	How can Fitness functions be found for any optimization problem? Explain, in detail, Fitness Function in Genetic algorithm.	**07**
	(b)	Give the difference between Fuzzification and Defuzzification	**07**
		OR	
Q.4	**(a)**	Explain the architecture of FLC	**07**
Q.4	**(b)**	What is fuzzy rule based system? State various applications of fuzzy Systems.	**07**
Q.5	**(a)**	Give a brief account on Mutation and Crossover operators.	**07**
	(b)	Explain various methods in which encoding of chromosomes in Genetic Algorithms can be done.	**07**
		OR	
Q.5	**(a)**	Explain Genetic algorithm in terms of Reproduction, Selection, Evaluation and Replacement?	**07**
	(b)	How can Fitness functions be found for any optimization problem? Explain, in detail, Fitness Function in Genetic algorithm.	**07**

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