



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : PE-EC702C/PEROB701B Neural Network and Fuzzy Logic Control

UPID : 007713

Time Allotted : 3 Hours

Full Marks : 70

The Figures in the margin indicate full marks.

Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

[1 x 10 = 10]

1. Answer any ten of the following :

- (i) The truth values of traditional set theory is _____ and that of fuzzy set is _____.
 a) Either 0 or 1, between 0 and 1 b) Between 0 and 1, either 0 or 1
 c) Between 0 and 1, between 0 and 1 d) Either 0 or 1, either 0 or 1
- (ii) The room temperature is hot. Here the hot (use of linguistic variable is used) can be represented by _____.
 a) Fuzzy Set b) Crisp Set c) Fuzzy and Crisp Set d) None of the mentioned
- (iii) What's the main point of difference between human and machine intelligence?
 a) Human perceive everything as a pattern while machine perceive it merely as data
 b) Human have emotions
 c) Human have more IQ and intellect
 d) Human have sense organs
- (iv) What is competitive learning?
 a) Learning laws which modulate difference between synaptic weight and output signal
 b) Learning laws which modulate difference between synaptic weight and activation value
 c) Learning laws which modulate difference between actual output and desired output
 d) None of the mentioned
- (v) Traditional set theory is also known as Crisp Set theory.
 a) True b) False
- (vi) Which of the following is false?
 a) Neural networks are artificial copy of the human brain.
 b) Neural networks have high computational rates than conventional computers.
 c) Neural networks learn by examples
 d) None of the mentioned
- (vii) Fuzzy Set theory defines fuzzy operators. Choose the fuzzy operators from the following.
 a) AND b) OR c) NOT d) All of the mentioned
- (viii) There are also other operators, more linguistic in nature, called _____ that can be applied to fuzzy set theory.
 a) Hedges b) Lingual Variable c) Fuzz Variable d) None of the mentioned
- (ix) Fuzzy logic is usually represented as _____.
 a) IF-THEN-ELSE rules b) IF-THEN rules
 c) Both IF-THEN-ELSE rules & IF-THEN rules d) None of the mentioned
- (x) State whether Hebb's law is supervised learning or of unsupervised type?
 a) Supervised
 b) Unsupervised
 c) Either supervised or unsupervised
 d) Can be both supervised & unsupervised
- (xi) What does vigilance parameter in ART determines?
 a) Number of possible outputs
 b) Number of desired outputs
 c) Number of acceptable inputs
 d) None of the mentioned
- (xii) Heteroassociative memory is also known as
 a) unidirectional memory.
 b) bidirectional memory.
 c) multidirectional associative memory.
 d) temporal associative memory.

Group-B (Short Answer Type Question)

Answer any three of the following :

[5 x 3 = 15]

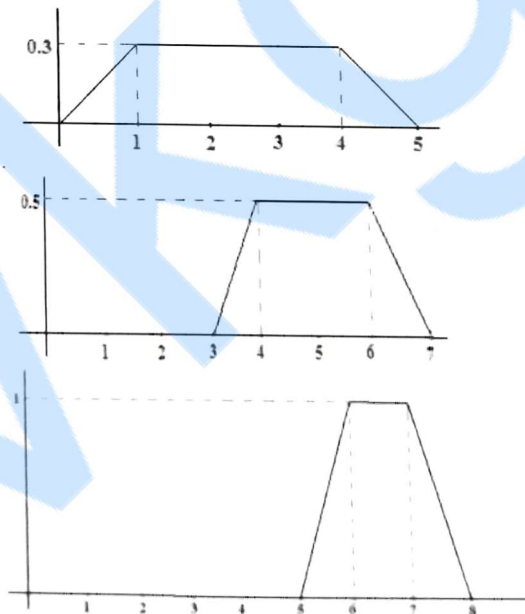
2. Explain Hebbian Learning Rule. [5]
3. List the advantages of Adaptive Resonance Theory (ART). [5]
4. Compare fuzzification with defuzzification. What are different types of Defuzzification method? [5]
5. Discuss the applications of neural network such as speech recognition and image compression. [5]
6. What do you mean by Multiple Adaptive Linear Neuron (Madaline)? [5]

Group-C (Long Answer Type Question)

Answer any three of the following :

[15 x 3 = 45]

7. (a) Explain Maxnet using an example. [5]
(b) Describe hamming net. [5]
(c) Explain Architecture of Kohonen Self -Organizing map. [5]
8. (a) What problem could occur in SOM learning if you use a very small neighborhood? [5]
(b) SOMs can reduce the dimensionality of a given data space. Explain what that means. [10]
Provide an example of how this capability can be used for practical applications.
9. (a) How Artificial neural networks are applied in future? [5]
(b) What are the advantages and disadvantages of neural networks? [10]
10. (a) Define McCulloch—Pitts neuron model with the help of example. [5]
(b) Describe madaline. [5]
(c) Write some advantages and disadvantages of associative memory. [5]
11. Let there be three different fuzzy sets as shown in the figures below:- [15]
Calculate the Defuzzified value by three Defuzzification methods.



*** END OF PAPER ***