



Name :

Roll No. :

Invigilator's Signature :

CS/B.TECH(IT)/SEP.SUPPLE/SEM-7/IT-703C/2012

2012

SOFT COMPUTING

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

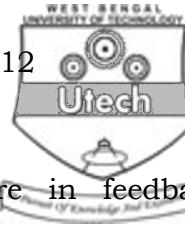
*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

- i) η is
 - a) perception constant
 - b) learning rate parameter
 - c) learning variable
 - d) threshold function constant.
- ii) In Piecewise-Linear activation function when the output is in between 0 and 1 then the value of ' v ' is
 - a) greater than equal to $\frac{1}{2}$
 - b) less than equal to $\left(-\frac{1}{2}\right)$
 - c) greater than $\left(-\frac{1}{2}\right)$ but less than $\frac{1}{2}$
 - d) none of these.



- iii) Which of the following is true ?
 - a) Only one feedback loop is there in feedback network
 - b) More than one feedback loop are there in feedback network
 - c) More than equal to one feedback loop are there in feedback network
 - d) None of these.
- iv) Generic Algorithm is a type of
 - a) Heuristic search algorithm
 - b) Breadth First Search algorithm
 - c) Depth First Search algorithm
 - d) Best First Search algorithm.
- v) The full form of BAM is
 - a) Bidirectional Associative Memory
 - b) Bidirectional Auxiliary Memory
 - c) Bitwise Associative Model
 - d) Boltzmann Associative Machine.
- vi) Choose the right answer :
 - a) Selection is
 - b) Mutation is
 - c) Crossover is
 - d) All of these are the operator(s) of Genetic Algorithm.
- vii) Height of a fuzzy set is
 - a) the total No. of elements in the set
 - b) the largest membership grade of the elements in the set
 - c) the average membership grade of the elements in the set
 - d) none of these.



- viii) $(A \vee B)'$ is equal to
 - a) $(A' \vee B')$
 - b) $(A \wedge B)'$
 - c) $A' \wedge B'$
 - d) none of these.
- ix) A classical set is defined by a
 - a) Fuzzy set
 - b) Membership fuzzy set
 - c) Crisp set
 - d) all of these.
- x) Synapses are
 - a) terminals of neurons
 - b) mediator between neurons
 - c) both (a) and (b)
 - d) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- 2. Compare between Fuzzy Logic and Crisp Logic.
- 3. Briefly explain about various types of activation functions.
- 4. What do you know about travelling salesman problem ? How can we solve it ?
- 5. Briefly write down about unsupervised learning.
- 6. What is perceptron ? Briefly discuss about Rosenbult's perceptron model.

$1 + 4$

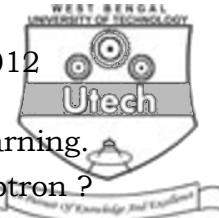
GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

- 7. a) What is Artificial Neural Network ?
- b) Differentiate between human brain and artificial neural network.
- c) Explain the artificial neural network Mcculloh-Pitt model.
- d) Briefly explain about the demerits of Mcculloh-Pitt model.

$2 + 5 + 5 + 3$



8. a) Briefly explain about error correction learning.
b) What do you mean by multi-layer perceptron ?
c) Prove the back propagation algorithm. 4 + 2 + 9

9. a) What is clustering ?
b) Why is clustering necessary ?
c) How many types of clustering algorithm are there and what are those ?
d) Write down any one clustering algorithm. 2 + 4 + 2 + 7

10. a) What is fuzzy set ?
b) What are the roll of α -cuts and strong α -cuts in fuzzy set theory ? What is the difference between them ?
c) What is fuzzy Cartesian product ?

Consider the following fuzzy relations :

$$R = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} \begin{bmatrix} 0.5 & 0.4 \\ 0.7 & 0.3 \end{bmatrix} \text{ and } S = \begin{bmatrix} y_1 \\ y_2 \end{bmatrix} \begin{bmatrix} 0.6 & 0.2 & 0.4 \\ 0.3 & 0.1 & 0.5 \end{bmatrix}$$

Find the relation which relates elements of universe Z using max-min compositions and max product composition.

11. Write short notes on any *three* of the following : $3 \times 5 = 15$

 - a) Fuzzification and Defuzzification
 - b) Genetic Algorithm
 - c) MADALINE Network
 - d) Baye's theorem
 - e) Perceptron Convergence Theorem.

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