CS/M.Tech (EIE)/SEM-2/EIEM-201(D-11)/09
SOFT COMPUTING THEORY AND PRACTICE (SEMESTER - 2)

1. ....
   Signature of Invigilator

2. ....   ***Reg. No.***
   Signature of the Officer-in-Charge

Roll No. of the Candidate

CS/M.Tech (EIE)/SEM-2/EIEM-201(D-11)/09
ENGINEERING & MANAGEMENT EXAMINATIONS, JULY – 2009
SOFT COMPUTING THEORY AND PRACTICE (SEMESTER - 2)

Time : 3 Hours]   [Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.

2. You have to answer the questions in the space provided marked 'Answer Sheet'. Write on both sides of the paper.

3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.

4. Read the instructions given inside carefully before answering.

5. You should not forget to write the corresponding question numbers while answering.

6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.

7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**

8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.

9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided
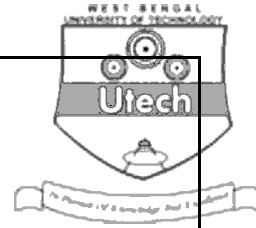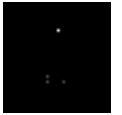

FOR OFFICE USE / EVALUATION ONLY
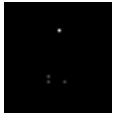Marks Obtained

Question Number										Total Marks	Examiner's Signature
Marks Obtained											

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Head-Examiner/Co-Ordinator/Scrutineer
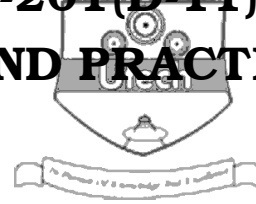
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SOFT COMPUTING THEORY AND PRACTICE
SEMESTER - 2

Time : 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.

Answer any *five* of the following.   5 ∞ 14 = 70

1. a) Explain the difference between probability theorem and possibility theorem with proper example.

    b) What are the benefits of fuzzy control ?

    c) When we can use a fuzzy controller ?

    d) "Fuzzy system is called knowledge-based system". Explain.   6 + 3 + 2 + 3

2. a) Explain Γ fucntion, Π function, S function, L function and Λ function with suitable examples.

    b) What is the use of T-norm and S-norm in fuzzy set operation ?   10 + 4

3. a) Why normalization and denormalization is required in fuzzy system design ?

    b) Differentiate between convex and non-convex fuzzy sets.

    c) "Ram is older than Raju" considering this linguistic expression develops a 5 ∞ 5 fuzzy relation, where domain of age is { 25, 35, 45, 55, 65 }. If age of Ram is described by $\frac{0 \cdot 1}{25} + \frac{0 \cdot 2}{35} + \frac{0 \cdot 5}{45} + \frac{0 \cdot 7}{55} + \frac{1}{65}$, then find out the age fuzzy set for Raju.

                                                                        6 + 2 + 6
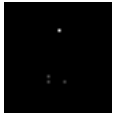
4. a) Why fuzzy controller is more effective in non-linear systems compare to conventional controller ?

    b) Explain the design principle of a two input fuzzy PD controller used in a negative feedback closed loop system.   4 + 10

5. a) What are the important of ANN ?

    b) Define bias and threshold in context of ANN.

    c) Write a MATLAB program to generate following activation functions that are being used in neural networks :

        i)   identity fucntion

        ii) binary sigmoidal fucntion

        iii) bipolar sigmoidal function.   3 + 4 + 7

6. a) Draw the structure of a biological neuron and compare biological neural network with artificial neural network.
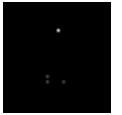
    b) What is significance of weights used in artificial neural networks ?

    c) Describe different types of activation functions.

    d) If the net input of an output neuron is 0·64 and steepness factor is 0·5, calculate its output when the activation function is

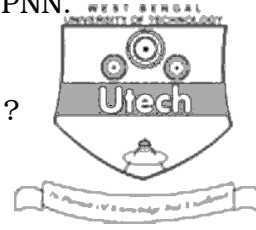   i)   binary sigmoidal

        ii) bipolar sigmoidal.   3 + 4 + 3 + 4

7. a) Discuss in detail the training algorithm used in BPNN.

    b) What is the use of learning rate in BPNN training ?

    c) Discuss the importance of learning rate in BPNN.   10 + 2 + 2

8. a) What is the use of projection and cylindrical extension in fuzzy set operation ?

    b) Calculate Mamdani implication and Zadeh implication,

    if $\widetilde{A} = 0 \cdot 9/x_1 + 0 \cdot 4/x_2 + 0 \cdot 7/x_3 + 1/x_4$ and $\widetilde{I} = 0 \cdot 7/y_1 + 0 \cdot 5/y_2 + 0 \cdot 9/y_3$.

                                                                4 + 10

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END