P.CODE:37221	R05	SET- 1

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
IV.B.TECH - I SEMESTER REGULAR EXAMINATIONS NOV/DEC, 2009
NEURAL NETWORKS AND FUZZY LOGIC
(Common to EEE, E.CON.E, MEP, AE, ICE, AME)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

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1. a) Explain the organization of brain in detail.
   b) Explain what is an artificial neural network and show how a basic ANN is constructed from a biological neuron concept. [8+8]

2. a) Briefly discuss about linear separability. Also, suggest a network that can solve EX-OR problem.
   b) Write short notes on artificial neural network architectures. [8+8]

3. a) Explain step by step procedure of single discrete perception training algorithm (SDPTA)
   b) Write short notes on "instar" and "outstar" learning. [8+8]

4. State and explain the generalized delta learning rule applied in back propagation algorithm. [16]

5. a) Explain the working of a Hopfield network with a neat sketch of its architecture.
   b) A Hopfield network made up of 5 neurons, which is required to store the following three fundamental memories.

$E_1 = \{+1, +1, +1, +1, +1\}^T$
$E_2 = \{+1, -1, -1, +1, -1\}^T$
$E_3 = \{-1, +1, -1, +1, +1\}^T$

   Evaluate the 5-by-5 synaptic weight matrix of the network. [8+8]

6. a) Distinguish between Crisp logic and Fuzzy logic.

   b) Consider the fuzzy sets $\tilde{A}$ & $\tilde{B}$ defined on the interval X = [0,5] of real numbers, by the membership grade functions.

$$\mu\tilde{A}(x) = \frac{X}{X+1}\ ,\ \mu\tilde{B}(x) = 2^{-X}$$

Determine the mathematical formulae and graphs of the membership grade functions of
   i) $A \cup B$
   ii) $A \cap B$ [8+8]

7. a) Write short notes on fuzzification interface and knowledge base in a fuzzy logic controller.
   b) Define defuzzification. Explain any two methods of defuzzification. [8+8]

8. Explain the application of neural networks in character recognition. [16]