

IV B.Tech II Semester Supplementary Examinations, April/May 2005
NEURAL NETWORKS & FUZZY LOGIC CONTROL
(Bio-Medical Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE Questions
 All Questions carry equal marks

1. (a) What is the significance of momentum term in back propagation learning.
 (b) Why convergence is not guaranteed for the back propagation-learning algorithm.
2. 6. A Hopfield network is designed to store the two fundamental memory patterns $(+1, +1, -1, +1, +1)$ and $(+1, -1, +1, -1, +1)$. The synaptic matrix of the network is given by

$$W = \begin{bmatrix} 0 & 0 & 0 & 0 & 2 \\ 0 & 0 & -2 & 2 & 0 \\ 0 & -2 & 0 & -2 & 0 \\ 0 & 2 & -2 & 0 & 0 \\ 2 & 0 & 0 & 0 & 0 \end{bmatrix}$$

- (a) The sum of the eigen values of the matrix W is zero why?
- (b) The state space of the network is a subspace of R^5 . Specify the configuration of this subspace.
3. (a) Explain Kohonen self organizing maps with example.
 (b) Explain with neat block diagram ART network architecture.
4. Explain the procedure of identification of dynamical system using neural networks.
5. (a) Let the universe of discourse be given by $U = \{5, 15, 20, 30, 40, 60, 80, 90\}$.
 i. Suggest a fuzzy set to describe the term “young”.
 ii. Suggest a fuzzy set to describe the term “old”.
 iii. Derive a fuzzy set to describe “not old”.
 iv. Derive a fuzzy set to describe “very young”.
 (b) Prove $M(A) + M(B) = M(A \cup B) + M(A \cap B)$
6. What are the main components of fuzzy logic controller? Explain each of them in detail.
7. (a) Compare and contrast fuzzy logic control and classical control system.
 (b) Summarize in a point form the design steps of fuzzy logic control.
8. Design a fuzzy controller for a temperature control system of a room. Assume your own control actions due to which the temperature of the room may vary. Design in fuzzy rule-based system to keep the room at a comfortable temperature.
