Sem VII CB9S
Electronics

( 3 Hours) [ Total Marks : 80

**N.B. :** (1) Question no. **1** is **compulsory**
(2) Solve any three from the remaining five questions
(3) Assume suitable data if necessary.
(4) **Figures** to the **right indicate** full **marks.**

1. Attempt **any four** of the following. 20
   (a) Differentiate between an artificial neural network and a digital computer.
   (b) What are excitatory and inhibitory weighted interconnections?
   (c) Differentiate between supervised and unsupervised learning.
   (d) What is a membership function?
   (e) Explain the delta rule of learning with an example.

2. (a) With the help of a flow chart, explain Single Continuous Perceptron 10
   Training Algorithm.
   (b) Implement the perceptron learning rule for the following set of input training 10
   vectors:
   $X_1 = [1 \ -1 \ 0 \ 1]^t$ ; $X_2 = [0 \ 1.5 \ -0.5 \ -1]^t$ ; $X_3 = [-1 \ 1 \ 0.5 \ -1]^t$
   The learning constant, c = 0.1 and the desired responses for $X_1$, $X_2$ and
   $X_3$ are $d_1 = -1$, $d_2 = -1$ and $d_3 = 1$ respectively. Assume the initial weight
   vector to be $W^1 = [1 \ -1 \ 0 \ 0.5]^t$ and obtain the updated weight vector
   after one epoch.

3. (a) With the help of a flow chart, explain error back propagation algorithm. 10
   (b) Give the network architecture of an Adaline network and discuss its training 10
   procedure.

4. (a) What are Discrete Hopfield Networks? Explain how patterns are stored 10
   in them.
   (b) With a neat architecture, explain the training algorithm of Kohonen self-
   organizing feature maps. 10

5. (a) Two fuzzy sets are defined as: 10

   $$\underset{\sim}{A} = \left\{ \frac{1}{2} + \frac{0.3}{4} + \frac{0.5}{6} + \frac{0.2}{8} \right\}$$

   $$\underset{\sim}{B} = \left\{ \frac{0.5}{2} + \frac{0.4}{4} + \frac{0.1}{6} + \frac{1}{8} \right\}$$

**[TURN OVER]**

QP Code : 728800

2

Perform union, intersection, difference and complement over these fuzzy sets.

(b)  Explain any four defuzzification methods with suitable diagrams.                    10

6.  Write short notes on **any four**:                                                               20
    (a)  Learning factors
    (b)  Perceptron convergence theorem
    (c)  Adaptive Resonance Theory
    (d)  Hebbian learning
    (e)  Adaptive neuro-fuzzy infonnation systems

-------------------