

(3 hours)

Total Marks: 80

Please check whether you have got the right question paper.

- N.B. 1. Question No. 1 is **compulsory**
 2. Attempt any **Three** out of remaining
 3. Assume suitable data if **necessary** and **justify** the assumptions
 4. Figures to the **right** indicate full marks

- Q1. [A] Describe any two Fuzzy membership functions. 05
 [B] Describe crossover points with example. 05
 [C] Describe with example support, core, normality, crossover points, & α -cut for a fuzzy set. 05
 [D] Describe Single Discrete Perceptron training Algorithm (SDPTA). 05
- Q2 [A] Describe Perceptron Learning rule with an example. 10
 [B] Describe any five defuzzification methods with example. 10
- Q3 [A] Describe Binary SVM in brief. 10
 [B] Perform two training steps using the delta learning rule for $\lambda = 1$ and $c = 0.25$. 10
 Train the network using the following data pairs
- $$\left(x_1 = \begin{bmatrix} 2 \\ 0 \\ -1 \end{bmatrix}, d_1 = -1 \right), \quad \left(x_2 = \begin{bmatrix} 1 \\ -2 \\ -1 \end{bmatrix}, d_2 = 1 \right),$$
- The initial weights are $w_1 = [-1 \ 1 \ 0]^t$.
- Q4 [A] Explain with example max-min composition and max-product composition. 10
 [B] Describe with example linearly separable and non-linearly separable pattern classification. 10
- Q5 [A] Describe in brief Natural Immune System. 10
 [B] Demonstrate Genetics algorithm with example. 10
- Q6 Describe the methods (any two) 20
 a. Genetics Algorithm in game playing
 b. Color Recipe prediction- Single MLP approach.
 c. Single Solution Particle Swarm Optimization