

(3 Hours)

Max. Marks: 80

- N.B.:** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **Three** questions out of remaining **Five** questions.
 (3) **Figures** to the **right** indicate **full** marks.
 (4) Assume suitable data if **necessary**.

- Q.1 a Explain with neat diagram supervised and unsupervised learning in NN **5**
 b Explain different activation functions in NN **5**
 c Explain with example any 2 operators involved in simple GA **5**
 d Explain different defuzzification techniques. **5**
- Q.2 a Design Hebb Net to implement logical AND function. Use bipolar inputs and targets. **10**
 b Explain Error back propagation training Algorithm with the help of flowchart. **10**
- Q.3 a Explain architecture of Bidirectional Associative Memory (BAM). How storage and retrieval performed in BAM. **10**
 b Explain the single layer Neural Network architecture using Perceptron model with suitable activation function. **10**

- Q.4 a Two fuzzy relations are given by

R		b1	b2	b3
	a1	0.4	0.5	0
	a2	0.2	0.8	0.2

S		c1	c2
	b1	0.2	0.7
	b2	0.3	0.8
	b3	1.0	0.0

10

Find T as a max-min composition and max-product composition between the fuzzy relations.

- b Sketch the 5 layer ANFIS architecture mentioning the task of each layer. **10**
- Q.5 a Using Mamdani fuzzy model, Design a fuzzy logic controller to determine the wash time of domestic washing machine. Assume that the inputs are dirt and grease on cloths. Use 3 descriptors for each input variables and five descriptors for output variables. Derive necessary membership function and required fuzzy rules for the application. **15**
 b Explain Mamdani's and Zadeh's interpretation of fuzzy rule. **5**

Q.6 Write Short Note on:

- a Explain perceptron convergence theorem **5**
 b Binary Hopfield Network **5**
 c Delta Learning Rule **5**
 d McCulloch Pitts neuron model **5**
