(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	McCulloh Pitts neuron model	**5**

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