

Code: EE7T5B

**IV B.Tech - I Semester – Regular / Supplementary Examinations
November 2016**

**ARTIFICIAL INTELLIGENCE TECHNIQUES IN
ELECTRICAL ENGINEERING
(ELECTRICAL & ELECTRONICS ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Answer any FIVE questions. All questions carry equal marks

1.

- a) Compare biological neural network with artificial neural network. 7 M
- b) Describe ANN architectures with example. 7 M

2.

- a) What is back propagation? Derive it's algorithm with the help of a multi layered feed forward network? 10 M
- b) What are the learning difficulties and their improvements of back propagation? 4 M

3.

- a) What is Auto and hetero associative memories? The following unipolar binary vectors must be stored in the recurrent auto associative memory using outer product method with the nullification of the diagonal

$$S(1) = [1 \ 0 \ 0 \ 1 \ 0]^T$$

$$S(2) = [0 \ 1 \ 1 \ 0 \ 1]^T$$

$$S(3) = [1 \ 1 \ 0 \ 1 \ 0]^T$$

- i) Compute weight matrix
- ii) Test the response of the network with the input vector $[1 \ 0 \ 1 \ 1 \ 0]^T$

6 M

- b) Explain the basic architecture and operation of ART network.

8 M

4.

- a) Define the following terms with example. 6 M
 - i) Crisp operations
 - ii) Partition and Covering
 - iii) Fuzzy relations

- b) Let $X = \{1, 2, 3, \dots, 10\}$. Determine the cardinalities and relative cardinalities of the following sets. 8 M

- i) $A = \{(3, 1.0), (4, 0.2), (5, 0.3), (6, 0.4), (7, 0.6), (8, 0.8), (10, 1), (12, 0.8), (14, 0.6)\}$
- ii) $B = \{(2, 0.4), (3, 0.6), (4, 0.8), (5, 1.0), (6, 0.8), (7, 0.6), (8, 0.4)\}$

5.

- a) Discuss inference mechanism in fuzzy systems. 6 M
- b) What is defuzzification? Explain any three defuzzification methods with example. 8 M

6.

- a) Explain the following with example. 8 M
 - i) Offsprings
 - ii) Encoding
 - iii) Fitness function
 - iv) Reproduction

b) Summarize the advantages and disadvantages of Genetic algorithms. 6 M

7.

a) Discuss cross over and mutation operators. 8 M

b) Draw and explain Genetic cycle. 6 M

8.

a) Confer how GA is used to generate rules in Fuzzy logic systems. 7 M

b) Draw the flow chart of FLC-GA based structural optimization. 7 M