

QP Code : 26740

[Total Marks : 80

(3 Hours)

- N.B.:**
- 1) Question No.1 is compulsory.
  - 2) Attempt any four from the remaining six questions.
  - 3) Use of calculator is allowed.

- Q.1 Attempt the following
- A) What is fuzzification? Explain in brief intuition method. 5
  - B) Explain in brief reinforcement learning. 5
  - C) Write a short note on mutation operator in GA. 5
  - D) Differentiate between Hard Computing and Soft Computing. 5
- Q.2
- A) What is defuzzification? What are the different methods of defuzzification process? 8
  - B) Explain architecture of Adaline with its training algorithm. 7
- Q.3 A) Using Zadeh's notation, determine the  $\lambda$ -cut sets for the given fuzzy sets: 8
- $$A = \left\{ \frac{0}{x_1} + \frac{0.1}{x_2} + \frac{0.2}{x_3} + \frac{0.3}{x_4} + \frac{0.4}{x_5} + \frac{0.5}{x_6} + \frac{0.6}{x_7} \right\}$$
- $$B = \left\{ \frac{1}{x_1} + \frac{0.9}{x_2} + \frac{0.8}{x_3} + \frac{0.7}{x_4} + \frac{0.6}{x_5} + \frac{0.5}{x_6} + \frac{0.4}{x_7} \right\}$$
- Express the following for  $\lambda=0.4$
1.  $\bar{A}$  2.  $A \cup B$  3.  $A \cap B$  4.  $A \cup \bar{A}$  5.  $\bar{A} \cap \bar{B}$  6.  $\bar{A} \cup \bar{B}$  7.  $\overline{A \cap B}$  8.  $\overline{A \cup B}$
- B) Explain in brief fuzzy approximate reasoning. 7
- Q.4 A) Explain in brief individual and Multi-person fuzzy decision making techniques with the help of suitable example. 8
- B) Consider two fuzzy sets R and S 7
- |     |    |     |     |     |    |     |     |     |
|-----|----|-----|-----|-----|----|-----|-----|-----|
|     | Y1 | Y2  |     | Z1  | Z2 | Z3  |     |     |
| R = | X1 | 0.4 | 0.6 | S = | Y1 | 1   | 0.4 | 0.3 |
|     | X2 | 0.3 | 0.5 |     | Y2 | 0.7 | 0.2 | 0.4 |
- Find Max-min composition  $T = R \cdot S$  and Max-product composition  $U = R \cdot S$
- Q.5 A) What is Fuzzy Inference system (FIS)? Explain it along with its types. 8
- B) What is the difference between Genetic algorithm and traditional algorithm? Explain encoding techniques in GA. 7
- Q.6 A) Using inference method, find the membership values for each of the triangular shapes (I, R, E, IR, T) for each of the following (all in degrees): 8
- i) 20, 40, 120
  - ii) 45, 45, 90
- B) Explain in brief architecture of Fuzzy Logic Controller (FLC). 7
- Q.7 Write a short note on any three 15
- i) Associative Memory Networks
  - ii) Crossover operator in GA
  - iii) Travelling Salesman Problem
  - iv) Operations on Fuzzy Relations
  - v) Special Networks