

[4959] - 1097
B.E. (E & TC) (Semester-II)
SOFT COMPUTING TECHNIQUES
(2012 Course) (Elective - III)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:-

- 1) Answers any four questions out of Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks
- 4) Assume Suitable data if necessary

Q1) a) Draw and explain nonlinear model of neuron. [6]

b) Explain the architecture and training algorithm of learning vector quantization(LVQ). [6]

c) Describe various operations that can be performed for fuzzy sets. [8]

OR

Q2) a) Discuss linear separability concept. Explain gradient descent algorithm.[6]

b) Explain cover's theorem. Describe the mapping function like Gaussian and multiquadratic. [6]

c) Explain the concept of composite linguistic variables and the use of concentration and dilation operations [8]

Q3) a) Explain block diagram of fuzzy inference system (FIS) in detail. [6]

b) Describe in detail the following process of defuzzification: [6]

i) Centroid method

ii) Weighted average method

c) Implement a simple two input single output FIS employing Mamdani model. [6]

OR

Q4) a) Discuss in detail the process of fuzzification. What are the various methods of fuzzification? [6]

b) Explain Sugeno fuzzy model of FIS with example. [6]

c) Given a rule : If x is A, THEN y is B, where $A = \left\{ \frac{0.3}{1}, \frac{0.7}{2}, \frac{0.8}{3} \right\}$ and

$B = \left\{ \frac{0.8}{5}, \frac{0.6}{7}, \frac{0.3}{9} \right\}$ Infer B' for another rule : IF x is A' THEN y is B'

where A' is $\left\{ \frac{0.2}{1}, \frac{0.9}{2}, \frac{0.4}{3} \right\}$ using Mamdani implication rule and max - min composition. [6]

Q5) a) Explain in detail the architecture of fuzzy logic controller. [8]

b) What are the steps involved in designing fuzzy logic controller. State the applications of FLC. [8]

OR

Q6) a) Compare fuzzy logic controller with traditional PID controller. Discuss the assumptions in fuzzy control system design. [8]

b) Discuss the application of FLC in air craft landing control problem in detail. [8]

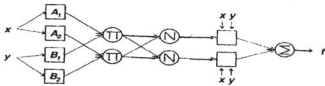
Q7) a) Explain in detail ANFIS with architecture. [8]

b) Discuss in detail two pass learning in ANFIS. [8]

OR

Q8) a) Explain hybrid learning algorithm employed in ANFIS. [6]

- b) Compute output f for ANFIS network shown in fig. Assume A_1, A_2, B_1, B_2 as gbell membership function. [10]



Given : $x = 20, y = 25$

Premise parameters			
A_1	$a = 40$	$b = 2$	$c = 0$
A_2	$a = 40$	$b = 2$	$c = 70$
B_1	$a = 40$	$b = 2$	$c = 0$
B_2	$a = 40$	$b = 2$	$c = 70$
Consequent Parameters			
f_1	$p_1 = 0.6$	$q_1 = 0.9$	$r_1 = 0.3$
f_2	$p_2 = 0.5$	$q_2 = 0.4$	$r_2 = 0.2$

