Total No of Questions: [12] *SEAT NO. :*

[Total No. of Pages : 2]

B.E. 2008 (Electronics &Telecommunication)
SOFT COMPUTING(404189)
(Elective - III) (Semester - II)

Time: 3 Hours ***Max. Marks : 100***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data if necessary***

SECTION I

Q1) a) Define Soft Computing and explain its constituents along with conventional artificial intelligence in detail. [8]

b) Write short note on: [10]

i. Advantages of Artificial Neural Network

ii. Neuro Fuzzy and soft Computing characteristics

OR

Q2) a) Consider two fuzzy sets A & B [18]

$$A = \left\{\frac{1}{2} + \frac{0.5}{3} + \frac{0.3}{4} + \frac{0.2}{5}\right\}$$

$$B = \left\{\frac{0.5}{2} + \frac{0.7}{3} + \frac{0.2}{4} + \frac{0.4}{5}\right\}$$

Perform the following operation on fuzzy sets

i. $A \cup B$

ii. $A \cap B$

iii. complement of fuzzy set A

iv. difference $\left(\frac{A}{B}\right)$

v. algebraic sum of given fuzzy sets.

vi. bounded sum of the given fuzzy set.

vii. algebraic product of the given fuzzy sets

viii. $\overline{A \cup B}$

ix. $A \cup \bar{B}$

Q3) a) Explain fuzzy logic, fuzzy set , membership function and fuzzy relation. [8]

b) Describe in detail the process of defuzzification. what are various methods of [8]

defuzzification and explain any two methods in detail.

OR

Q4) a) What is fuzzy reasoning? Discuss in detail the fuzzy reasoning for : [8]

i) multiple rules with multiple antecedents
ii) single rule with multiple antecedents

b) Explain situations where fuzzy logic controllers are more appropriate than conventional PID controller. [8]

Q5) a) Draw & explain the block diagram of fuzzy logic controller. What are the steps involved in designing a fuzzy logic controller? [8]

b) Describe the architecture of Mamdani type fuzzy logic controller with a suitable example. [8]

OR

Q6) a) Explain the following terms with reference to fuzzy inference system : [6]
i) Premise (antecedent) ii) Conclusion (consequent) iii) Rule- base

b) Write short note on: [10]
i) Sugeno Fuzzy Inference Model
ii) Synthesis and validation of fuzzy controller

SECTION II

Q7) a) List and explain various neural network learning methods. [8]

b) Generate the output of logic AND function by McCulloch-Pitts model. [8]

OR

Q8) a) Define activation function and explain various types of activation functions. [8]

b) Explain architecture of single layer perceptron and training algorithm used in perceptron. [8]

Q9) a) Describe in details the back propagation learning rule for multilayer perceptron (MLP) what are different methods used for speeding up of MLP training. [8]

b) List the applications of neural network in communication. Explain any one in detail. [8]

OR

Q10) a) Discuss the architecture and training algorithm of Radial basis function network. [8]

b) What are the applications of neural network in Image processing? Explain any one in detail. [8]

Q11) a) Explain in detail adaptive neuro fuzzy inference system (ANFIS) with Architecture. [10]

b) Explain architecture and training algorithm of Self Organized Map (SOM) [8]

OR

Q12) Write notes on (any three) : [18]

a) Hybrid learning algorithm
b) Advantages of ANFIS over FIS
c) ANN for process control
d) Synthesis and validation of fuzzy controller