

2072
M.E. (Computer Science and Engineering)
Second Semester
CS-8203: Soft Computing

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

1. (a) Differentiate between expert system and ANN. [5 x 2 = 10]
(b) What is the difficulty in solving speech recognition by an artificial neural network model?
(c) Differentiate between pattern association and pattern classification tasks.
(d) Why is fuzzy logic leading to more human intelligent machines?
(e) What is roulette wheel selection technique?

SECTION – A

2. (a) Write short notes on: [6]
 - i. Fuzzy Systems
 - ii. Genetic Algorithms
(b) To what extent are the Web – Search engines and Supermarket bar code scanners an instance of artificial intelligence. Discuss. [4]
3. (a) Differentiate between three models of artificial neuron, namely Mc-Culloch Pitts, Perceptron and Adaline. [5]
(b) Determine the weights of a network with 4 input and 2 output units using
(i) Perceptron learning law and (ii) Delta learning law with $f(x) = 1/(1 + e^{-x})$ for the following input-output pairs:
Input: $[1100]^T$ $[1001]^T$ $[0011]^T$ $[0110]^T$
Output: $[11]^T$ $[10]^T$ $[01]^T$ $[00]^T$
Discuss your results for different choices of the learning rate parameters. Use-suitable values for the initial weights. [5]
4. (a) State the general methods of recall of information in neural networks? [2]
(b) What are the main problems with the back-propagation learning algorithm? How can learning be accelerated in multilayer neural networks? Define the generalised delta rule. [5]
(c) Prove that Bidirectional Associative Memory for binary or bipolar units is stable for asynchronous update of units. [3]

P.T.O.

(2)

SECTION - B.

5. (a) Explain in detail operation of ART for binary patterns. [3]
(b) Differentiate between multilayer feedforward neural network and counter-propagation network for a pattern mapping task based on performance metric. [4]
(c) Write a short note on Boltzmann machine. [3]
6. (a) Compare Bayesian reasoning and certainty factors. Which applications are most suitable for Bayesian reasoning and which for certainty factors? Why? What is a common problem in both methods? [5]
(b) Define a linguistic variable and its value. Give an example. How are linguistic variables used in fuzzy rules? Give a few examples of fuzzy rules. [5]
7. (a) What are the main steps in developing a fuzzy expert system? What is the most laborious and tedious part in this process? Why? [4]
(b) Why are genetic algorithms called genetic? What is a schema? Give an example of a schema and its instances. Explain the relationship between a schema and a chromosome. What is the Schema Theorem? [6]

x-x-x