

2063
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. Attempt the following:-

- (a) Define Intelligence. State the intelligent behaviour in swarm intelligence systems.
- (b) Differentiate between pattern association and pattern classification tasks.
- (c) What are the benefits of integrating expert systems, fuzzy logic and neural networks?
- (d) When can knowledge be inexact and data incomplete or inconsistent?
- (e) Explain Rank space method.

(5×2)

SECTION – A

2. (a) Is Artificial Intelligence a Science or Engineering? Explain your choice with supporting illustrations. [3]
- (b) Write short notes on: [4]
 - i. Swarm Intelligence System
 - ii. Expert System
- (c) To what extent are the voice – activated telephone menus an instance of artificial intelligence. Discuss. [3]
3. (a) Give three examples of pattern recognition tasks to illustrate the superiority of the biological neural network over a conventional computer system. [3]
- (b) Using the Instar learning law, group all the sixteen possible binary vectors of length 4 into four different groups. Use suitable values for the initial weights and for the learning rate parameter. Use a 4-unit input and 4-unit output network. Select random initial weights in the range [0, 1]. [5]
- (c) Differentiate between stability and convergence. [2]
4. (a) Give a real life example to illustrate the pattern environment storage problem. [2]
- (b) Explain storage, encoding, retrieval, stability and performance with reference to an associative memory. [4]
- (c) Derive the BAM training algorithm. What constraints are imposed on the storage capacity of the BAM? [4]

P.T.O.

(2)

SECTION – B

5. (a) Explain how a pattern classification problem leads to a radial basis function. [3]
(b) Explain gain control mechanism in ART network. [3]
(c) Explain the steps required in developing a fuzzy expert system. [4]
6. (a) What is probability? Describe mathematically the conditional probability of event A occurring given that event B has occurred. What is the Bayesian rule? [4]
(b) How do we evaluate multiple antecedents of fuzzy rules? Give examples. Can different methods of executing the AND and OR fuzzy operations provide different results? Explain your answer. [4]
(c) Write a short note on fuzzy inference system. [2]
7. (a) How does a rule-based expert system propagate uncertainties using the Bayesian approach? [4]
(b) What are the main steps in genetic programming? Draw a flowchart that implements these steps. What are advantages of genetic programming? Why has LISP become the main language for genetic programming? [6]