CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
IV–B.TECH–I–Semester End Examinations (Regular) - December- 2025
NATURE INSPIRED COMPUTING
(CSM)

[Time: 3 Hours]   **[Max. Marks: 60]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 10 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A   (10 Marks)

1. a) Define Evolutionary Computing and its significance.   [1M]
   b) Differentiate between Hill Climbing and Simulated Annealing.   [1M]
   c) Explain the structure of an Artificial Neural Network.   [1M]
   d) List different learning algorithms used in Neural Networks.   [1M]
   e) What is Swarm Intelligence? Give one example.   [1M]
   f) Explain the role of Ant Colonies in optimization.   [1M]
   g) Define Artificial Immune Systems.   [1M]
   h) Discuss the importance of Negative Selection Algorithm.   [1M]
   i) List any two applications of Nature Inspired Computing in Bioinformatics.   [1M]
   j) Explain Information Display as a case study in Nature Inspired Computing.   [1M]

PART-B   (50 Marks)

2. Explain problem solving as a search task and discuss Hill Climbing algorithm with example.   [10M]

OR

3. Discuss Evolutionary Biology and how it inspired computing methods.   [10M]

4. Compare different types of neural network architectures.   [10M]

OR

5. Describe Artificial Neural Networks and their learning algorithms with suitable diagrams.   [10M]

6. Explain Swarm Robotics and its applications in real-world problem solving   [10M]

OR

7. Discuss the concept of Social Adaptation of Knowledge in Swarm Intelligence.   [10M]

8. Explain the working of Clonal Selection and Affinity Maturation in Artificial Immune Systems.   [10M]

OR

9. Describe Bone Marrow Models and their computational relevance   [10M]

10. Discuss how Bioinformatics uses Nature Inspired Computing for data analysis.   [10M]

OR

11. Explain the concept of Information Display and its relevance to Nature Inspired Computing.   [10M]

****