M.Tech. Degree Examination

CST/CFIS/DS
I SEMESTER

ADVANCED DATA STRUCTURES AND ALGORITHMS
(Effective from the admitted batch 2017–18)

Time: 3 Hours Max.Marks: 60

Instructions: Each Module carries 12 marks.
Answer all modules choosing one question from each module.
All parts of the module must be answered in one place only.
Figures in the right hand margin indicate marks allotted.

MODULE-I

1. a) Define Queue? What are the Applications of Queue? 6
   b) Define Stack? Explain the Towers of Hanoi concept 6

OR

2. a) Explain Array representation of Priority Queue 6
   b) Explain Interpolation in brief 6

MODULE-II

3. What is Binary Tree? Write about Preorder, Inorder and Postorder
   Traversal of Binary Tree with example 12

OR

4. Define B-trees? How it improve the efficiency of operations on
   trees? Explain Insertion, Deletion and Search operations of B-trees
   with example 12

MODULE-III

5. Explain Matrix Multiplication with the help of Divide and Conquer
   concept? Write about Strassen’s Matrix Multiplication 12

OR

6. Describe Dijkstra’s algorithm for single source shortest path with
   example 12
MODULE-IV

7. a) Define Dynamic Programming concept? What are the applications of Dynamic Programming? 6
   b) What is Reliability Design? How to use Dynamic Programming to solve a problem with a multiplicative optimization function? 6

OR

8. a) Describe General Method of Back Tracking in brief 6
    b) Solve Graph Coloring Problem with Back Tracking method 6

MODULE-V

9. a) What is Traveling Sales Person Problem? How to solve Traveling Sales Person Problem with Branch and Bound? 6
   b) Find the reduced cost matrix for the Traveling Sales Person Problem which defined by cost matrix,

   \[
   \begin{pmatrix}
   \infty & 7 & 3 & 12 & 8 \\
   3 & \infty & 6 & 14 & 9 \\
   5 & 8 & \infty & 6 & 18 \\
   9 & 3 & 5 & \infty & 11 \\
   18 & 14 & 9 & 8 & \infty
   \end{pmatrix}
   \]

   OR

10. Write about NP-Hard Scheduling Problems in detail 12

[2,16,17/I S/217]