

Code: CSCS1T1

**I M.Tech-I Semester- Special Supplementary Examinations  
March 2019**

**DATA STRUCTURES AND ALGORITHMS  
(COMPUTER SCIENCE & ENGINEERING)**

Duration: 3 hours

Max.Marks:70

Answer any FIVE questions. All questions carry equal marks

- 1.a) Explain time and space complexity related to algorithms and also state their importance. 8 M
- b) What is a doubly linked list? List the advantages and disadvantages of using such lists. 6 M
- 2.a) Write an algorithm to merge two sorted list L1 and L2. List L1 is sorted in increasing order and list L2 in sorted in decreasing order. 7 M
- b) Explain Binary Search Technique with an example. 7 M
- 3.a) A binary tree T has 9 nodes. The inorder and preorder traversals of the tree yield the following sequence of nodes:  
Inorder: E A C K F H D B G  
Preorder: F A E K C D H G B Draw the tree T. 6 M
- b) What is a Minimum Spanning Tree?. Write ADT routine for Depth First Search (DFS) traversal. 8 M

- 4.a) What is a Dictionary? Explain operations on Dictionaries. 6 M
- b) What is Hashing? Can a perfect Hash function be made? Justify your answer. Explain in brief the various methods used to resolve collision. 8 M
- 5.a) What is an Abstract Data Type? Explain with an example. 4 M
- b) What are priority Queues? How can priority queues be implemented? Explain in brief. 6 M
- c) Illustrate Multi way Merge with an example. 4 M
- 6.a) Write an algorithm to delete a node N in a binary search tree. It is assumed that N has exactly one child? 6 M
- b) Explain the operations of binary search tree with an example. 8 M
- 7.a) What is an AVL tree? Explain how a node can be inserted into an AVL tree? 8 M
- b) Explain the Different Rotations of AVL Trees. 6 M

- 8.a) Define a B tree of order  $m$ . Write algorithms to 8 M
- (i) Search for a key in B-tree.
  - (ii) Insert a key in a B-tree.
  - (iii) Delete a key from a B-tree.
- b) Write a short note on Red-Black trees. 6 M