

**Time: 3 Hours****Max. Marks: 60****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 8 marks and may have a, b, c as sub questions.

**PART - A****5 × 4 Marks = 20**

- 1.a) Write a procedure to convert infix expression to postfix expression. Apply the procedure on the following  

$$((A+B)*D) \uparrow (E-F)$$
 [4]
- b) Define Binary tree. Write an algorithm to insert an element in to a binary tree. [4]
- c) Write the principle of (i) Quick sort (ii) Merge sort and write their complexities. [4]
- d) Construct an AVL Tree by inserting numbers from 1 to 8. [4]
- e) Explain Kruskal's Algorithm for Minimum cost spanning trees. [4]

**PART - B****5 × 8 Marks = 40**

2. What is meant by stack? Write push and pop functions in C++ using an array. [8]
- OR**
- 3.a) Write a short note on Linked List. What the various applications of linked list? [4+4]
- b) Write an algorithm for deleting an element from the linked list. [4+4]
4. With a neat sketch explain DFS and BFS traversals with an example. [8]
- OR**
5. Explain Binary tree ADT and its representation in Array and Linked lists. [8]
6. Suppose a sequence of numbers is given like: 5, 1, 6, 7, 9, 22, 10, 55, 45, and 34. How this numbers will be sorted using a) Insertion Sort b) Bubble sort. [8]
- OR**
7. Write an algorithm for linear search and Binary Search and compare them in terms of time complexity. [8]
8. Explain in detail about Red-Black trees and Splay trees with examples. [8]
- OR**
- 9.a) Show the result of inserting 3, 1, 4, 6, 9, 2, 5, 7 into an initially empty binary search tree. [4+4]
- b) Show the result of deleting the root. [4+4]
10. Discuss about Job Sequencing with deadlines and Single Source Shortest path problem. [8]
- OR**
11. Explain the Pattern matching algorithm with an example. [8]

