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**BT-3/D-21** **43197**

DATA STRUCTURES AND ALGORITHMS

Paper : PC-CS-AIDS-205A

Time : Three Hours] [Maximum Marks : 75

**Note :** Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

## UNIT–I

**1.** (a) Write the Binary Search Algorithm and discuss its time complexity.

(b) What do you understand by data structure? Differentiate between linear and non-linear data structures.

**2.** (a) What do you understand by time and space complexities? What are their applications? Discuss.

(b) Write the Bubble Sort algorithm and discuss its time complexity.

## UNIT–II

**3.** What is a circular queue? Write the algorithm to insert and delete the elements in circular queue. What are the advantages of circular queue over simple queue.

**4.** (a) What is stack data structure? Discuss its application in recursion.

(b) Write the algorithm to perform PUSH and POP operation in linked list implementation.

## UNIT–III

**5.** (a) What is a singly linked list? Write the algorithm to insert a node in a sorted singly linked list.

(b) What is a circular linked list? Discuss its applications.

6. (a) What is doubly linked list? Write the algorithm to delete a node the address of which is 'X'.

(b) What are the merits and demerits of linked list implementation of stack/queues over array implementation.

## UNIT–IV

7. (a) Define and differentiate tree and graph data structure.

(b) What is binary search tree? What is height balanced tree? What is the need of balancing the tree.

8. (a) Discuss the breadth first traversal of graph data structure,

(b) Write the note on threaded binary tree.