

Roll No. ....

Total Pages : 03

**BT-3/D-23**

**43218**

**DATA STRUCTURES AND ALGORITHMS**

**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) What is the importance of data structures in solving problems ? How are data structures classified ? Give two examples of each type to highlight their distinction.  
(b) What is meant by asymptotic analysis of an algorithm ? Describe the commonly used asymptotic notations used to represent the complexity of an algorithm.
2. (a) What are sparse matrix and two-dimensional arrays ? Explain using an example how two dimensional arrays and sparse matrix can be used to solve problems.  
(b) Describe, how an array will be sorted using Bubble sort ?

## Unit II

3. Show how a stack is implemented using arrays. Write an algorithm for evaluating a postfix expression using a stack. Describe one more application of Stack.
4. What is the difference between Linear Queue, Circular Queue, and Priority Queue ? What operations can be performed on Queues ? Also describe any *one* application of Queues.

## Unit III

5. Describe the advantages of Linked Lists over arrays. How is an element inserted and deleted in a Linked List ?
6. (a) What are Circular and Doubly linked list ?  
(b) Describe one application where a linked list may be used.

## Unit IV

7. Define binary tree and show how can it be traversed. Bring out the distinction between binary tree and threaded binary tree. How will a binary tree be created for the following input ?  
10, 15, 12, 7, 8, 18, 6, 20
8. Describe the methods for representing graphs ? What is depth first traversal of a graph ?