

Roll No. ....

Total Pages : 2

**BT-3/D-18**

**33111**

**DATA STRUCTURES**

**Paper-IT-203(N)**

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 Array? What are its characteristic features? Provide the formula to access an element in one-dimensional and two-dimensional array (Column major order).  
(b) Write the algorithm of bubble sort, and compare its time complexity with selection sort.
2. (a) What do you understand by Data structure? What is the difference between Sequential implementation and Linked implementation? Discuss.  
(b) What is Binary search? What is its time complexity? Write the recursive algorithm to perform binary search.

**UNIT-II**

3. (a) What do you understand by Stack data structure? Write the algorithm to push and pop an element in a stack using sequential implementation.

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14/12

- (b) What is Circular queue? Write the algorithm to insert a node in a circular queue.
4. (a) Discuss in detail the procedure of converting an infix expression to prefix expression using stack.  
(b) What is Priority queue ? What are its applications? Discuss.

**UNIT-III**

5. (a) What is Doubly linked list? Write the procedure to insert a node in a sorted doubly linked list.  
(b) Discuss the algorithm to insert/delete a node in a linked list representing a queue.
6. (a) What is Linked list? What are its merits and demerits over array data structure? Discuss.  
(b) What is Circular list? What is the need of it? Explain.

**UNIT-IV**

7. (a) Define Tree. What is a Complete binary tree? Discuss using suitable example.  
(b) What is Binary Search Tree (BST)? Discuss the algorithm to insert a node in a BST.
8. (a) What is Graph? What is the relationship between a graph and tree data structure? What are the applications of graph data structure? Discuss.  
(b) What is Height balanced tree? What is the need of balancing a tree? Discuss.

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2

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