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Total No. of Questions : 11 ]

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# **BC-396**

**B.C.A. (Part-III) Examination, 2021**

## **DATA STRUCTURE**

Paper - BCA-302

*Time : 1½ Hours ]*

*[ Maximum Marks : 70*

### **Section-A**

**(Marks : 2 × 10 = 20)**

**Note :-** Answer all *ten* questions (Answer limit **50** words). Each question carries **2** marks.

### **Section-B**

**(Marks : 4 × 5 = 20)**

**Note :-** Answer all *five* questions. Each question has internal choice (Answer limit **200** words). Each question carries **4** marks.

### **Section-C**

**(Marks : 10 × 3 = 30)**

**Note :-** Answer any *three* questions out of five (Answer limit **500** words). Each question carries **10** marks.

### **Section-A**

2 each

1. Attempt all questions.

- (i) Write difference between Primitive and Composite Data Type.
- (ii) Define the term time complexity.

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- (iii) What are the applications of linked list ?
- (iv) Write difference between singly linked list and doubly linked list.
- (v) Define a binary tree. How is it different from general trees ?
- (vi) What are the maximum and minimum number of nodes in a binary tree of height 3 ?
- (vii) What is Sorting ?
- (viii) Discuss the complexity of insertion sort.
- (ix) What is hash table ?
- (x) What is Collision ? Explain with the help of example.

**Section-B**

4 each

**Note** :- Attempt all *five* questions.

2. Explain Depth First Spanning Tree.

**Or**

Explain Breadth First Spanning Tree.

3. A binary tree has 10 nodes. The preorder and inorder traversal of the tree are given. Draw the corresponding binary tree :

**Preorder** : J, C, B, A, D, E, F, I, G, H

**Inorder** : A, B, C, E, D, F, J, G, I, H

**Or**

Discuss the postorder traversal technique.

4. Explain how selection sort is used for sorting numbers. Also write difference between heap sort and bubble sort.

*Or*

Write notes on the following :

- (i) Hash function
  - (ii) Mid square method of hashing technique
5. Write difference between stack and queue.

*Or*

Using example explain how infix expression is converted into post fix expression.

6. Write the algorithm to perform enqueue and dequeue operations on a queue.

*Or*

What is priority queue ? Discuss its types.

**Section–C**

10 each

**Note** :- Attempt any *three* questions.

7. Discuss the following :
- (a) Big-Omega notation
  - (b) Big-Theta notation
  - (c) Best, average and worst case complexity of an algorithm
8. What is circular linked list ? How is it different from singly linked list ?
9. Discuss the array representation of linked list in memory. What are the problems faced with array representation of linked list ?
10. Write a program in C/C++ to implement bubble sort to sort the data of an array.
11. Write a program in C/C++ to find largest number from an array.