

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.-4)  
**DATA STRUCTURE AND ALGORITHMS**

Subject Code : BTCS-301-18

M.Code : 77567

Date of Examination : 02-06-2023

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a. What is asymptotic analysis? Why are asymptotic notations important?
- b. Compare array and link list.
- c. Discuss the sequential representation of a tree.
- d. Discuss the concept of merge sort.
- e. Differentiate between BFS and DFS.
- f. What are linear and non-linear data structures?
- g. What are Binary search trees? Give example.
- h. What is hashing? Discuss the various hash functions with example.
- i. What is a priority queue? How it is used?
- j. What is threading? How it is used in binary trees?

## SECTION-B

2. Write algorithm for selection sort and discuss the same for the following sequence.

12 34 16 14 23 11 19 15 20

3. Compare the adjacency list and matrix representations of a graph.
4. Define binary tree. Write a recursive algorithm for Preorder and Postorder traversals of a binary tree.
5. Write algorithm to insert a new node at the beginning of a singly link list.
6. Write algorithm for postfix evaluation. Give the postfix form of following expression :

$(a - b * c + d) / (e + f)$ .

## SECTION-C

7. Develop a max heap from the following sequence of nodes and apply heap sort. Show all the intermediate steps.

7 32 9 14 52 45 68 48 39 20 42

8. Design an AVL tree from the following nodes by inserting nodes one by one. Show all the steps and rotations :

8, 9, 10, 2, 1, 5, 3, 6, 4, 7, 11, 12

9. What do you mean by circular queue? How insertion and deletion are performed on a circular queue? Write algorithm and give example.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**