

Roll No.

Total No. of Pages : 02

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**B.Tech.(IT) (Sem.-3)**  
**DATA STRUCTURE & ALGORITHMS**

Subject Code : BTIT-301-18

M.Code : 76391

Date of Examination : 18-12-2023

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) Give the classification of data types.
- b) What are B+ trees?
- c) What is the data structure that is used in expression evaluation?
- d) Compare the performance of Merge and bubble sorts. Give the postfix form of an expression:  $(a - b * c + d) / (e + f)$ .
- e) What is the Principle of stack and what are its applications?
- f) Compare Array and Linked list.
- g) How you can traverse elements of a binary tree?
- h) How a binary tree can be represented using an array?
- i) What is the advantage of circular list?
- j) Suppose a complete binary tree has n elements. What is the height of the tree?

## SECTION-B

2. Write an algorithm to insert a new node in the existing sorted single linked list. Discuss your algorithm with the help of a suitable example.

3. Show the bubble sort steps for the following numbers.

25,10,72, 18,40, 11,32,9

4. Convert the given infix expression to postfix  $(A + B) * (C - D) / E * F + G - H$

5. Write a program to perform various operations on binary search trees using linked list as data structure.

6. What are the graph traversal techniques? Explain any one technique with example.

## SECTION-C

7. Insert the following keys in the height balanced trees, showing all the intermediate steps 342, 206, 444, 523, 607, 301, 142, 183, 102, 157 and 149.

8. Explain the merging of two linked lists (existing in ascending order) to generate a sorted list.

9. **Explain the following:**

a) Graph traversal algorithms

b) Graph representation methods.

**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.**