

Roll No.

Total No. of Pages : 02

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

Subject Code : BTCS-301-18

M.Code : 79985

Date of Examination : 07-07-22

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 are various asymptotic notations to represent complexity of algorithms?
- b) What is the difference between Algorithm and Flowchart?
- c) Write down the advantages and disadvantages of binary search over linear search?
- d) How the complexity of an algorithm is calculated? Write a note on Time Space Trade off complexity.
- e) What type of data structure is 'structure' is?
- f) Explain UFO and FIFO functions in stack using suitable example.
- g) Explain the difference in linear and non-linear data structures.
- h) Explain the circular queue data structure.
- i) What are the advantages of using AVL tree over binary tree?
- j) Define inorder traversal of a tree giving example.

## SECTION-B

2. Write an algorithm for searching a duplicate node from a link list.
3. Write the advantage and disadvantage of Array and Link List data structures.
4. Write an algorithm to convert infix expression to postfix expression by taking a suitable example.
5. Illustrate the concept of depth-first search and breadth first traversing of graph.
6. Write an algorithm to build Binary search tree for the following list:  
7, 12, 30, 15, 12, 24, 25, 17, 19, 8.

Explain the choice of root node.

## SECTION-C

7. Write algorithms to perform the following operations on a doubly linked list.
  - a) (i) Insert a node with data 'y' after a node whose data is 'x'.
  - b) (ii) Delete a node whose data is 's'.
  - c) (iii) Insert a node with data 'a' as the 1st node of the list.
8. Write an algorithm to create a circular queue. Also write down the algorithm to insert node in the circular queue by considering all possible cases.
9. Write down the algorithm for insertion and selection sort and compare their complexities.

**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.**