

Roll No. _____

3031

**B. Tech. 3rd Semester (CSE)
Examination – February, 2022**

**DATA STRUCTURES & ALGORITHMS
(Only for Dec.-2019 Re-appear Students)**

Paper : PCC-CSE-203-G

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting one question from each Unit. Question Number 1 is compulsory. All questions carry equal marks.

1. (a) What are linear and non-linear data structures ?
2.5

(b) What are the various operations that can be performed on different data structures ? 2.5

- (c) What is Queue ? How it is different from stack ? 2.5
- (d) What are Infix, Prefix and Postfix notations ? 2.5
- (e) What is a linked list and what are its types ? 2.5
- (f) How to check if a given binary tree is BST or Not ? 2.5

UNIT - I

2. (a) What do you mean by time complexity of an algorithm ? Explain the notation used to denote the time complexity of an algorithm. 8
- (b) What do you mean by the term data structure ? Discuss the basic operations of data structures with example. 7
3. What is an array ? Discuss the various operations that are allowed on array data structures. Describe the formula for calculating the address of any element of a two dimensional array. 15

UNIT - II

4. (a) What do you mean by Stack ? Explain with the help of algorithm for its operations: PUSH and POP. 8

- (b) What is a Postfix notation ? Also give Postfix notations of the following : 7

$$((A+B)^* C/D+E^*F)/G$$

5. What is a circular queue ? Write an algorithm to implement circular queues using array for enqueue (), dequeue () and display () operations. 15

UNIT - III

6. What is doubly linked list ? Describe the procedure for inserting and deleting nodes from double linked list with example. 15
7. What is Binary Tree ? Explain its types and operations on binary trees. Also explain about threaded binary tree. 15

UNIT - IV

8. Give a complete description about graphs. 15
9. Describe the following :
- (i) Merge sort 7
- (ii) Bubble sort 8