Code No: 133AG

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
### B.Tech II Year I Semester Examinations, May/June - 2019
### DATA STRUCTURES THROUGH C++
#### (Common to CSE, IT)

Time: 3 Hours          Max. Marks: 75

**Note:** This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

## PART- A
(25 Marks)

| | | |
|---|---|---|
| 1.a) | Define inheritance and polymorphism. | [2] |
| b) | Describe omega and theta notations. | [3] |
| c) | Write the motivation of sparse matrices. | [2] |
| d) | Explain the ADT of stack. | [3] |
| e) | What is a binary tree? | [2] |
| f) | Explain about the ADT of priority queues. | [3] |
| g) | Define hash function. | [2] |
| h) | Explain about time complexity of merge sort. | [3] |
| i) | What is a binary search tree? | [2] |
| j) | Give an example of DFS. | [3] |

## PART-B
(50 Marks)

| | | |
|---|---|---|
| 2.a) | Explain constructors and destructors with examples. | |
| b) | Write about linear data structures with examples. | [5+5] |

**OR**

| | | |
|---|---|---|
| 3.a) | Explain about throwing an exception. | |
| b) | What is recursion? Explain about data abstraction. | [5+5] |

| | | |
|---|---|---|
| 4.a) | Explain array representation of stack. | |
| b) | Describe circular lists and header nodes. | [5+5] |

**OR**

| | | |
|---|---|---|
| 5.a) | Discuss in detail about ADT of queue. | |
| b) | Briefly explain about applications of stack. | [5+5] |

| | | |
|---|---|---|
| 6.a) | Explain about Insertion and deletion operations in max heap. | |
| b) | What are properties of binary trees? Explain. | [5+5] |

**OR**

| | | |
|---|---|---|
| 7.a) | Discuss about the ADT BinaryTree. | |
| b) | What is a threaded binary tree? Explain. | [5+5] |

| | | |
|---|---|---|
| 8.a) | Write C++ program for heap sort technique. | |
| b) | Give comparison of searching methods. | [5+5] |

**OR**

| | | |
|---|---|---|
| 9.a) | Write C++ program for insertion sort technique. | |
| b) | Analyze the time complexity of quick sort technique. | [5+5] |

10. Explain the following:
    a) Applications of graphs
    b) Red-black tress. [5+5]

**OR**

11. Explain the following:
    a) Adjacency matrix
    b) Insertion into an AVL search tree. [5+5]

---oo0oo---