Code No: **R201208** **R20** **SET - 1**

I B. Tech II Semester Regular/Supplementary Examinations, July/August- 2023

DATA STRUCTURES THROUGH C

(Only for Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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UNIT-I

1. a) Define ADT. Explain operations of Array ADT with examples. [7M]
   b) Define Queue ADT. Explain operations of Queues with example each. [7M]

(OR)

2. a) Define Stack. What are the applications of stacks? Convert following expression X+(Y * Z) – ((N * M +O) /P) in to postfix form. [7M]
   b) Define time and space complexity of an algorithm. Explain Big-O notation, Theta notation and Omega notation to represent complexity of an algorithm. [7M]

UNIT-II

3. a) Explain the implementation of stacks using linked lists. [7M]
   b) Explain various operations of Single linked lists. [7M]

(OR)

4. a) Define Sparse Matrix. Explain how to represent a Sparse matrix using linked lists. [7M]
   b) Explain various operations of Double linked lists. [7M]

UNIT-III

5. a) Construct a binary tree given the pre-order and in order traversals as follows: [7M]
   Pre-Order: G B Q A C K F P D E R H **In-Order :** Q B K C F A G P E D H R
   b) What is a Binary tree? Discuss representation of a binary tree using arrays and linked list. [7M]

(OR)

6. a) Define Binary Search Tree. Show how to insert and delete an element from BST. [7M]
   b) Construct max heap for the following with program: [7M]
   140, 80 , 30 , 20 ,10 ,40 ,30 ,60 ,100 ,70 ,160 ,50 , 130, 110, 120

UNIT-IV

7. a) Discuss Kruskal's algorithm to find minimal cost spanning tree with an example. [7M]
   b) Write Breadth first traversal algorithm. Explain with an example. [7M]

(OR)

8. a) Define Graph. Explain how to represent a graph using Arrays and Linked lists. [7M]
   b) Explain Warshall's algorithm to find transitive closure of a graph with a suitable example. [7M]

UNIT-V

9. a) Explain the Merge sort algorithm to sort the following elements: [7M]
   12, 25, 5,9, 1, 84, 63, 7, 15, 4, 3.
   b) Compare Linear, Binary and Fibonacci search with respect to their time complexity in best case worst case and average case. [7M]

(OR)

10 a) Explain the Quick sort algorithm to sort the following elements: [7M]
   12, 25, 5,9, 1, 84, 63, 7, 15, 4, 3.
   b) What is Linear search? Write n algorithm to find the position of the required element in an array of elements. [7M]

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