Code No: **R1632024** **R16** SET - 1

III B. Tech II Semester Regular/Supplementary Examinations, August–2021

DATA STRUCTURES

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A **(14 Marks)**

1. a) How to assess the time and space complexities? Give example. [2M]
   b) Generate postfix and prefix representations for the infix expression: [2M]
   *(a+b)-c*d/e+f.*
   c) Write program for enqueue with linked lists. [2M]
   d) What is threaded binary tree? Write its applications. [3M]
   e) Brief out insertion and deletion of vertices and edges to the graph. [3M]
   f) Explain the importance of middle element in binary search. [2M]

PART –B **(56 Marks)**

2. a) Write a program to print transpose of a given matrix and also derive its time complexity. [7M]
   b) Illustrate multi-dimensional array ADTs with sample program and analyze it. [7M]

3. a) What is priority Queue? Explain the implementation of Priority queue. Write an algorithm for operations on Priority queues with an example? [7M]
   b) What is recursion? How it solves the problems? Explain its application in solving Towers of Hanoi problem. [7M]

4. a) Write a recursive function to print elements of a Linked List in reverse order. [7M]
   b) If a stack is implemented with linked lists, how to perform push and pop operation? Explain with a sample program. [7M]

5. a) Construct a Binary Search Tree (BST) with the following keys: 86, 12, 42, 69, 38, 57, 74, 6, 49, and 71. Also delete 42 from the Constructed BST. [7M]
   b) Write a function to find an element and its position in a Binary Tree. How to balance it? Give example. [7M]

6. a) Define Graph and explain how Graphs can be represented in Adjacency matrix and Adjacency list? [7M]
   b) How to find the transitive closure of a graph using Warshal's algorithm? Explain with example. [7M]

7. Consider the elements 3, 4, 12, 42, 56, 14, 53, 67, 19, 34, 76, 89, 10 and implement: i) Radix sort; ii) Shell Sort; iii) Heap Sort. [14M]

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