

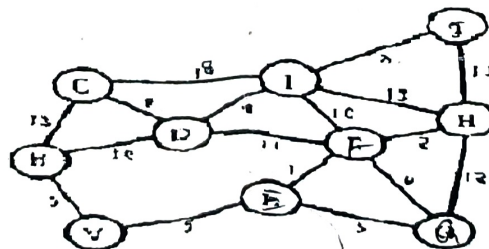
FACULTY OF ENGINEERING

B.E. (IT) III-Semester (AICTE) (Main & Backlog) (New) Examination, February/ March 2023

Subject: Data Structures**Time: 3 Hours****Max. Marks: 70**

- Note:** (i) First question is compulsory and answer any four questions from the remaining six questions. Each Question carries 14 Marks.
 (ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
 (iii) Missing data, if any, may be suitably assumed.

- What is Space complexity & Time Complexity of a program?
 - What is Stack data structure? List down its applications.
 - Define Circular Lists and Available Space Lists.
 - Differentiate between Singly and Doubly Linked Lists
 - Define Tree, Degree of node and Degree of a Tree
 - Differentiate between Complete and Full Binary Tree
 - Differentiate Linear and Binary Search.
- Define Algorithm? Explain about the Recursion with the help of example?
 - Explain Asymptotic Notations? Show that the time complexity of a function $f(n) = 5n^2 - 4n + 256, (n \geq 0)$ is $f(n) = \Omega(n^2)$.
- Define Abstract Data Type. Write and explain the algorithm for String Pattern Matching – Simple Algorithm?
 - Define Sparse Matrices? Evaluate the postfix notation $p: 5, 6, 2, +, *, 12, 4, /, --$? Convert the expression $A+B-C/D+E$ to prefix notation.
- Explain Linked Stacks and Linked Queues and explain its insertion and deletion Operation with their algorithms?
 - Define Template Class Chain? Explain clearly about Circular Lists with their algorithm
- What AVL Tree? Explain the procedure of applying AVL Tree rotations?
 - Explain different Binary Tree Traversal techniques with an example?
- Write and explain the algorithm for BFS & DFS for a graph along with an example?
 - Write and explain the Prim's Algorithms in detail?.
- Construct a minimum cost spanning tree for the following weighted graph using kruskal's Algorithm



- b) Describe the working of quick sort on the following keys : 10, 5, 8, 3, 2, 9

0 1 2 3 4 5