322453(22)

B. E. (Fourth Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(CSE Branch)

DATA STRUCTURES

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) of each unit is compulsory and carries 2 marks. Attempt any two parts from (b), (c) and (d) each question and carries 7 marks.

Unit-I

1. (a) Explain space and time complexity.   2

    (b) Explain sparse matrix and their representation.   7

(c) Write an algorithm to add two polynomials. 7

(d) Write an algorithm to insert a new node at the front of circular linked list. 7

Unit-II

2. (a) What is Tail Recursion? 2

(b) Write an algorithm for recursive solution to the tower of Hanoi problem for N disks. 7

(c) Write each step to convert following expression to postfix expression by using stack.

$$Q = A + \left(B * C - \left(D/E \uparrow F\right) * G\right) * H$$

7

(d) Write algorithm to insert and delete elements in a circular queue. 7

Unit-III

3. (a) Define complete binary tree. 2

(b) Explain Threaded Binary Tree. 7

(c) Create tree for the following given. 7

Inorder : C A F D G H B

Preorder : D A C F B G H

(d) Suppose A, B, C, D, E, F and G are 7 elements with weights as follows :

Item	A	B	C	D	E	F	G
Weights	15	10	5	3	7	12	25

Create an extended binary tree by Huffman algorithm. 7

Unit-IV

4. (a) Explain minimum cost spanning trees. 2

(b) Explain the Breadth First Search Algorithm for graph traversal with suitable example. 7

(c) Explain Kruskal's algorithm with example. 7

(d) Explain Warshall's algorithm for finding shortest path is graph. 7

Unit-V

5. (a) What is Hashing?   2

    (b) Explain the quick sort algorithm. What is the complexity of an algorithm?   7

    (c) Construct AVL tree for the following series

        40, 30, 20, 60, 50, 80, 15, 28, 25   7

    (d) Create a B-Tree of order 5   7

        1, 12, 8, 2, 25, 6, 14, 28, 17, 7, 52, 16, 48, 68, 3, 26, 29, 53, 55, 45