

Printed Pages – 4

Roll No. : .....

**B022312(022)**

**B.Tech. (Third Semester) Examination**

**Nov.-Dec. 2021** AICTE

**(CSE Branch)**

**DATA STRUCTURE & ALGORITHMS**

*Time Allowed : Three hours*

*Maximum Marks : 100*

*Minimum Pass Marks : 35*

*Note : Attempt any two parts from (b), (c) and (d) carry 8 marks and part (a) is compulsory of each unit contain 4 marks.*

**Unit-I**

1. (a) What is data structure? Explain time and space complexity. 4

(b) Write the Algorithm to insert new node at the

[ 2 ]

begining, at the middle position and at the end of a single linked list. 8

- (c) Write an algorithm to add two polynomials represented using linked list. 8
- (d) Explain sparse Matrices and their representation. 8

**Unit-II**

- 2. (a) Define overflow and underflow in stack. 4
- (b) Write an algorithm for recursive solution to the Tower of Hanoi problem for N disk. 8
- (c) Write an algorithm for push, pop and traversing of stack by using array. 8
- (d) Explain Priority Queue and also explain how you implement it by using array. 8

**Unit-III**

- 3. (a) What is Tree? Explain Array and Linked representation of Binary Trees. 4
- (b) Construct A Binary Tree from given Inorder and

[ 3 ]

Preorder Traversals. 8

Preorder : A B D H E C F G

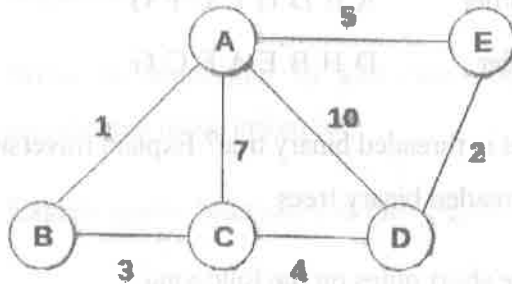
Inorder : D H B E A F C G

- (c) What is threaded binary tree? Explain traversing in threaded binary trees. 8
- (d) Write short notes on the following : 8
  - (i) Full binary tree
  - (ii) Complete binary tree
  - (iii) Strictly binary tree
  - (iv) Extended binary tree

**Unit-IV**

- 4. (a) What is graph explain sequential and linked representations of graph? 4
- (b) Write DFS algorithm for graph traversal with suitable example. 8
- (c) Find the minimum spanning tree of the following graph using Kruskal's algorithm. 8

[ 4 ]



- (d) Explain Warshalls algorithm for shortest path in graph. 8

### Unit-V

5. (a) Explain Linear search. 4
- (b) Consider inserting the key - 29, 46, 18, 36, 43, 21, 24, 54 into hash table of size ( $M=11$ ) using linear probing consider the primary hash (.) is  $H(k)=k \pmod{m}$ . 8
- (c) Explain B+ tree and Hash Function. 8
- (d) Sort the following array by using radix sort. 8

348, 143, 361, 423, 538, 128, 321, 543, 366