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B033411(033)

B. Tech. (Fourth Semester) Examination, April-May 2021

(AICTE Scheme)

(Information Technology Branch)

DATA STRUCTURES

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Attempt all questions. Part (a) of each question is compulsory and carries 4 marks. Solve any* ***two*** *parts from part (b), (c) & (d) and carries 8 marks each.*

Unit-I

1. (a) Define Abstract Data Type (ADT). 4

(b) What is Sparse Matrix? Write an algorithm to transpose any sparse matrix of $m \times n$ size. 8

(c) Write Algorithm : 8

(i) Insertion @ begining of doubly linked list.

(ii) Insertion @ specific position of doubly linked list.

(iii) Insertion @ end of doubly linked list.

(d) How Polynomials are represented using linked list? Explain polynomial addition algorithm. 8

Unit-II

2. (a) Explain PUSH and POP operation of STACK. 4

(b) Write an algorithm which evaluates any given POSTFIX EXPRESSION. 8

(c) What is Recursion? Explain recursion with TOWER OF HANNOI. 8

(d) Write short notes on : 8

(i) D-QUEUE

(ii) Priority Queue

Unit-III

3. (a) Explain Array and Linked representation of Binary Tree. 4

(b) Explain In-order, Pre-order & Post-order tree traversing Algorithms using STACK. 8

(c) Explain how Insertion and Deletion can be done is BST (Binary Search Tree). 8

(d) Write short notes on : 8

(i) Threaded Binary Tree

(ii) AVL Tree

Unit-IV

4. (a) Explain Sequential and Linked Representation of graph. 4

(b) Explain Breadth First Search and Depth First Search Algorithm. 8

(c) What is Minimum Spanning Tree? Explain Kruskal Algorithm for constructing MST. 8

(d) Explain Adjacency and Path Matrix with suitable example. 8

Unit-V

5. (a) Explain Hashing. Explain the role of Hash function in Hashing. 4

(b) Explain Selection and Insertion Sort. Compare the complexities of both algorithms. 8

(c) Explain HEAP SORT with an example. 8

(d) Explain Binary Search. 8