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Roll No.

B033411(033)

**B. Tech. (Fourth Semester) Examination,
April-May 2022**

(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) Explain Asymptotic notation.

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- (b) Each element of an array Data [20][50] requires 4 bytes of storage. Base address of data is 2000. Determine the location of Data [10][10] in both order. 8
- (c) Write an algorithm for deletion of node in linked list at desired position with examples. 8
- (d) Write an algorithm for insertion of node in doubly linked list. 8

Unit-II

2. (a) Define Stack and write about the basic operation associated with stack. 4
- (b) Write an algorithm to convert infix to postfix expression. Convert following Infix to postfix expression : 8
- (i) $(A + B) / ((C * D + E) * F)$
- (c) Consider the following queue characters, where QUEUE is a circular array which is allocated memory cells : 8
- FRONT = 2, REAR = 4, QUEUE : _,A,C,D,_,_

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- (i) F is added to the queue
- (ii) S is added to the queue
- (iii) two letters are deleted
- (iv) one letter is deleted
- (v) K, L and M are added
- (vi) R is added to the queue
- (vii) Two letters are deleted
- (viii) One letter is deleted
- (d) Write an algorithm for recursive solution to the tower of Hanoi for N disks. 8

Unit-III

3. (a) What is Binary Tree? Write short notes on : 4
- (i) Complete binary tree
- (ii) Full binary tree
- (iii) Strictly binary tree
- (b) Draw binary tree for : 8

Pre-Order	G	B	Q	A	C	K	F	P	D	E	R	H
In-Order	Q	B	K	C	F	A	G	P	E	F	H	R

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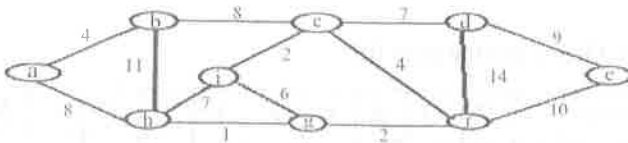
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- (c) Construct AVL tree using following keys. 8
10, 20, 38, 96, 30, 15, 56, 85, 40, 50
- (d) Write short notes on : 8
- (i) Threaded Binary Tree
 - (ii) B Tree
 - (iii) BS-T

Unit-IV

4. (a) Write short notes on : 4
- (i) Adjacency Matrices
 - (ii) Incidence Matrices
- (b) Write DFS algorithm for graph traversal with suitable example. 8
- (c) Explain Prim's algorithm and find minimum spanning tree for given graph. 8



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- (d) Explain Warshall's algorithm with suitable example. 8

Unit-V

5. (a) Write an algorithm for binary search and compare with linear search. 4
- (b) Write an algorithm for insertion sort and explain it with the functions given below : 8
11, 6, 21, 2, 31, 27, 101, 16, 9
- (c) What do you mean by Pivot element? Explain the Quick sort with suitable example. 8
- (d) Explain linear Probing Hashing Technique with suitable example. 8