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Total No. of Pages : 2

**BT-3/D05**

**8498**

**Data Structures**

**(Common with CO, IT) (2004-2005)**

**Paper—CSE-203E**

Time : Three Hours]

[Maximum Marks : 100

Note :—Attempt any FIVE questions.

1. (a) Explain, what is data structures and its applications ? 5  
(b) Discuss in detail "Stack". Also write the Algorithm and program in C language for PUSH and POP operations. 15
2. (a) Differentiate Structure and Union with example. 5  
(b) Write a C Program to find the Transpose of a Matrix. 7  
(c) Convert the following from infix to postfix. Also explain all the steps :—  
(i)  $A / B * C + D * E - A * C$   
(ii)  $(A + B) * D + E / (F + A * D) + C$ . 8
3. (a) Discuss the advantages and disadvantages of linked list over the array. 5  
(b) Explain doubly linked list. Also write the Algorithm for Insertion of a node at various places in doubly linked list. 15
4. Write Algorithms to insert, delete and search an element in a Circular Queue Implemented using linked list. 20
5. (a) Draw a Tree, whose Pre-order and In-order traversals are given below :— 5  
Pre-order : A B D E G H I C F  
In-order : D B G E I H A F C  
(b) Write the functions for following Binary Tree Traversals :—  
(i) In-order  
(ii) Pre-order  
(iii) Post-order. 5×3=15



6. (a) Define the terms :-

(i) Degree of a tree

(ii) Height of a tree

(iii) External and Internal Nodes.

$$1+2+2=5$$

(b) Write short notes on :—

(i) AVL tree

(ii) B<sup>+</sup> Tree

(iii) Binary Search tree.

$$5 \times 3 = 15$$

7. (a) Explain minimum-spanning tree. What are its uses ? 5

(b) Define Graph. Write BFS Traversals algorithm for traversing a graph and also explain it with an example. 15

8. (a) What is hash function ? When are the perfect hashing function feasible ? 5

(b) Explain the heap sort technique by taking the list :

8 15 7 6 24 16 20 30 14 35.

$$15$$