

CSE
3-8 Sem-06
Ind copy,

YES.



8



Roll No.

Total No. of Pages : 3

BT-3/D06

8496

DATA STRUCTURES

Paper : CSE-203-E

Time : Three Hours]

[Maximum Marks : 100

Note :— Attempt any **FIVE** questions.

1. (a) Define abstract data type and give any three applications of ADTS. 5
(b) Write an algorithm which translates a POSTFIX expression to an INFIX expression. 8
(c) Show with an example how a UNION is implemented. Also differentiate between a UNION and a STRUCTURE in C. 7
2. (a) Show with an example how an array is passed as a parameter in C. 7
(b) What are the main types of PRIORITY QUEUES ? Explain each one in detail. 8
(c) Show how to implement three stacks in one array. 5
3. (a) What are the advantages and disadvantages of representing a group of items as an array versus a linear linked list ? 7
(b) What are the steps to inserting a new item at the head of a linked list ? Use one short English sentence for each step. 5
(c) Write a program to swap two adjacent elements by adjusting only the pointer (and not the data) using :
 - (i) Singly linked lists.
 - (ii) Doubly linked lists. 8

IT-06 & C88
3rd-sem same

4. (a) Explain in detail why dynamic data structures are needed. 7
- (b) What are the three primitive operations that can be applied to Queues ? Explain briefly. 5
- (c) Write an algorithm to reverse the order of items on a list. Prove that your algorithm works correctly. 8
5. (a) Explain the following :—
- (i) STRICTLY binary tree.
- (ii) Complete binary tree.
- (iii) Almost complete binary tree. 6
- (b) The order of nodes of a binary tree in PREORDER and INORDER Traversal are as under :
- PREORDER — B C E D F A G H.
- INORDER — A B C D E F G H.
- Draw the corresponding Binary Tree. 5
- (c) Two binary trees are similar if they are both empty or both non-empty and have similar left and right subtrees. Write a function to decide whether two binary trees are similar. 9
6. (a) Write a note on :
- (i) Efficiency of Binary Search tree operations.
- (ii) Balanced trees. 5
- (b) Write an algorithm to find K^{th} element of a list represented by a tree and also show that the number of tree nodes examined in finding the K^{th} list element is less than or equal to 1 more than the depth of the tree. 7
- (c) What are the broad categories of non-binary trees ? Describe any one in detail. 8

- ✓
7. (a) Write a non-recursive depth first traversal algorithm for graphs. 10
(b) Explain Prim's algorithm in detail. 10
8. (a) What is the purpose of hashing ? Describe any one method used to handle collisions in hashing. 8
(b) Sort the list 3, 1, 4, 1, 5, 9, 2, 6, 5, 3, 5, 8, 9, 7 using any one of them :
(i) Heapsort.
(ii) Quicksort.
- 12