

22317

11819

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Illustrate your answers with neat sketches wherever necessary.
  - (3) Figures to the right indicate full marks.
  - (4) Assume suitable data, if necessary.

- |   | <b>Marks</b> |
|---|--------------|
| <b>1. Attempt any FIVE of the following :</b>   | <b>10</b>    |
| (a) Define the term algorithm.  |              |
| (b) List any 4 applications of queue.   |              |
| (c) Describe following terms w.r.to tree :  |              |
| (i) leaf node   |              |
| (ii) level of node  |              |
| (d) Differentiate between stack and queue. (any two points)   |              |
| (e) Describe undirected graph with suitable example.  |              |
| (f) Define the terms : linear data structure and non-linear data structure.                                       |              |
| (g) Convert infix expression into prefix expression : $(A + B)*(C / G) + F$                                       |              |
| <b>2. Attempt any THREE of the following :</b>  | <b>12</b>    |
| (a) Describe working of linear search with example.   |              |
| (b) Describe the concept of linked list with the terminologies : node, next pointer, null pointer and empty list. |              |
| (c) Describe queue full and queue empty operation conditions on linear queue with suitable diagrams.              |              |
| (d) Differentiate between general tree and binary tree. (any four points)   |              |

## 3. Attempt any THREE of the following :

12

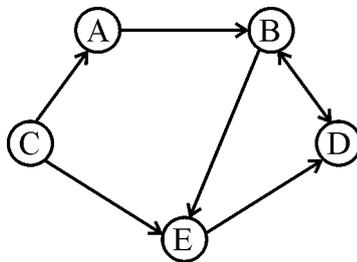
- (a) Write 'c' program for deletion of an element from an array.
- (b) Convert following expression into postfix form. Give stepwise procedure.

$$A + B \uparrow C * (D / E) - F / G$$

- (c) Find the position of element 29 using binary search method in an array 'A' given below. Show each step.

$$A = \{11, 5, 21, 3, 29, 17, 2, 43\}$$

- (d) Give adjacency list and adjacency matrix for given graph :



## 4. Attempt any THREE of the following :

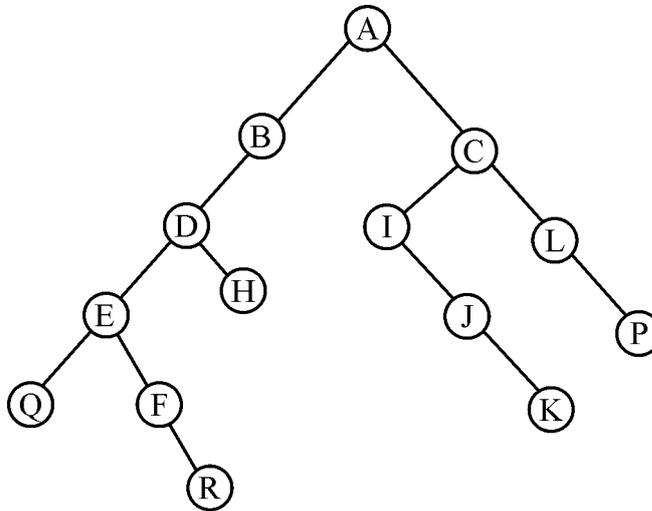
12

- (a) Describe working of bubble sort with example.
- (b) Construct a binary search tree for following elements :  
30, 100, 90, 15, 2, 25, 36, 72, 78, 10 show each step of construction of BST.
- (c) Write an algorithm to count number of nodes in singly linked list.
- (d) Write a program in 'C' to insert an element in a linear queue.
- (e) Describe circular linked list with suitable diagram. Also state advantage of circular linked list over linear linked list.

5. Attempt any TWO of following :

12

- (a) Write algorithm for performing push and pop operations on stack.  
 (b) For given binary tree write in-order, pre-order and post-order traversal.



- (c) Write an algorithm to insert an element at the beginning and at end of linked list.

6. Attempt any TWO of the following :

12

- (a) Describe working of selection sort method. Also sort given input list in ascending order using selection sort input list – 55, 25, 5, 15, 35.  
 (b) Define the term recursion. Write a program in C to display factorial of a entered number using recursion.  
 (c) Describe procedure to delete an element from singly linked list using diagram.

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