

# 17330

**13141**

**3 Hours / 100 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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. a) Attempt any **SIX** of the following: 12
- i) Define the term:
    - 1) Primitive data structure
    - 2) Non primitive data structure.
  - ii) Define data structure ? Enlist approaches to design an algorithm.
  - iii) Differentiate between Merge sort and Quick sort any two points.
  - iv) Write any two applications of stacks.
  - v) Define the given tree terminology:
    - 1) Degree of node
    - 2) Leaf node
  - vi) Define the term General tree and Binary tree.
  - vii) Define searching and sorting ? Enlist its types ?
  - viii) Define collision resolution technique.

P.T.O.

b) **Attempt any TWO of the following:****08**

- i) Describe time and space complexity related to algorithms with example.
- ii) Describe the working principle of radix sort ?
- iii) Define queue ? Explain how two pointer front and rear related to queue with diagram.

**2. Attempt any FOUR of the following:****16**

- a) Sort the number in ascending order using selection sort  
 $A = \{ 42, 23, 74, 11, 65 \}$ .
- b) Write a 'C' program to calculate factorial of number using recursion.
- c) Define the term node, address, null pointer and empty list for linked list.
- d) Describe representation of binary tree.
- e) Write an algorithm to insert and delete an element from queue.
- f) Write a 'C' program for bubble sorting method.

**3. Attempt any FOUR of the following:****16**

- a) Describe primitive operation on stack.
- b) Describe priority queue with an example ? Explain its type.
- c) Explain with suitable diagram how to delete a node from singly linked list at the start and at the end of list.
- d) Write an algorithm for inorder traversal of binary tree.
- e) Draw the tree structure for expression given below:  
 $(a - 3b) (2x - y)^3$
- f) Describe directed graph and undirected graph with diagram.

4. Attempt any **FOUR** of the following:

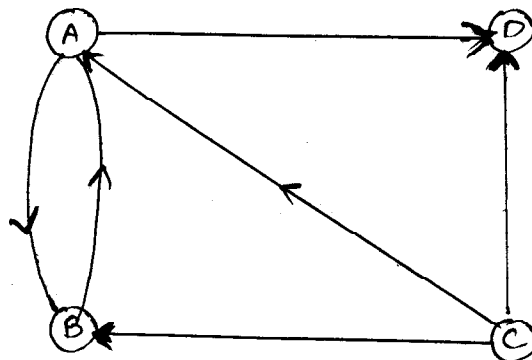
16

- Write a 'C' program to insert an element in an array.
- Evaluate the given postfix expression to find its value  
( 6, 2, 3, +, -, 3, 8, 2, +, +, 2, ↑, 3, +, \* )
- Describe circular queue with an example.
- Describe doubly link list with an example.
- Write an algorithm for search operation in unsorted singly linked list ?
- Draw a binary search tree for the number given:  
50, 33, 44, 22, 77, 35, 60, 40.

5. Attempt any **TWO** of the following:

16

- Find the position of element 88 using binary search method in an array given below:  
A = { 77, 33, 44, 11, 88, 22, 66, 55 }  
Write a 'C' program for binary search.
- Write a 'C' program to implement push and pop function in stack as an array.
- Consider the graph given in figure No. 1. Find its adjacency matrix and adjacency link representation.

**Fig. No. 1**

6. Attempt any TWO of the following:

16

- a) Convert the given infix string to prefix expression and shows the details of stack at each step.

$$(A - B/C) * ( D * E - F)$$

- b) Describe breadth first traversal of graph.
- c) What is binary tree ? For given tree perform preorder postorder and inorder traversal. Refer figure No. 2.

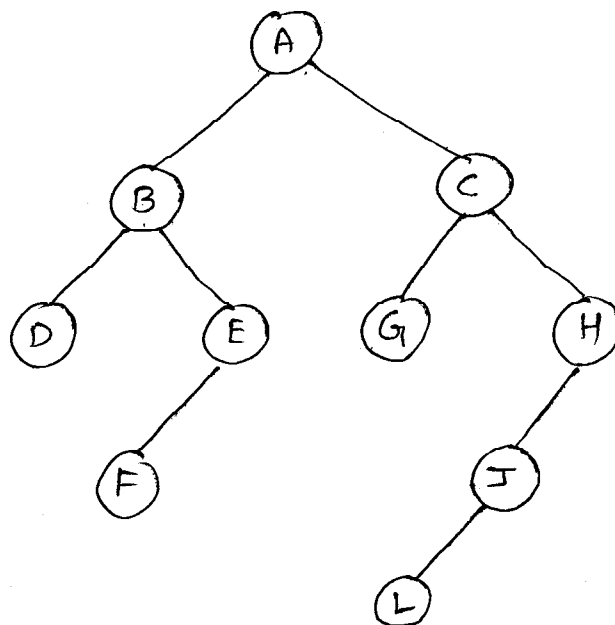


Fig. No. 2

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