

Importance Question

**A. 1. An array A [- 2:2, - 3:3] is stored in a memory whose starting address is 100. Assume the word size for each element is 2. Find the following :**

- a. Total elements in array A.
- b. Total memory required to store entire array.
- c. The location for A [- 1] [2] in column major order

**2. Give the array representation of following polynomial:**

$$4x^4y^2 - 9x^2y^3 - 10xy^2 + 6xy - 20 - 30$$

**OR**

A. What is an Array? Explain its Types and Draw memory representation of two-dimensional array using row-major order and column-major order.

B. What is searching? Explain Sequential search along with algorithm and differentiate between binary search and Sequential search methods.

**OR**

B. List Five Sorting Techniques and Explain Selection Sort with algorithm.

**A. What is a stack ? Explain all operations of stack along with their Algorithm.**

**OR**

**A. Convert following infix expression to prefix.**

(1)  $(P * Q) * R - S / T$

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

**B. Answer Following (Any Two)**

- a. Write algorithm to insert into and delete from Simple queue.
- b. What is Queue? List all types of queue and explain any two.
- c. A circular queue Q has size 5 and front is at 1 and rear at 2

$$Q = 43, 23, \_, \_, \_$$

Perform following operation on Q :

- (i) insert 67
- (ii) Insert 45
- (iii) insert 99
- (iv) insert 87

**Answer Following Questions (Any Seven)**

1. What is Linked List ? Give difference between Linked List and array.
2. Write an algorithm to insert an element in Front of Singly Linked List.
3. Explain Circular Linked List in brief.
4. Write an algorithm for Bubble Sort Method.
5. Trace Binary Search for following data to search 34.

23, 26, 32, 34, 56, 78, 89

6. Explain Heap sort in brief.
7. Give representation of polynomial using linked list and draw storage representation for following polynomial.  
 $63xyz^3 + 45x^4y^2 + 12yz + 199$
8. Write an algorithm to delete an element from Doubly Linked List.
9. Draw empty Circular Singly Linked list and Empty Circular Doubly Linked List(with Header node)

A. Answer following (Any Two)

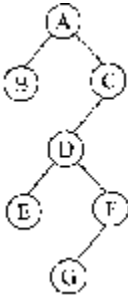
1. Draw B tree of order 3 for following data :  
 12, 10, 4, 22, 18, 16, 14, 8, 25, 6, 1
2. Write a short note on Threaded Binary Tree.
3. Explain AVL Tree with Proper Diagram.

B. Answer following (Any Six)

1. Define Forest
2. Draw Binary Tree from following Array

1	2	3	4	5	6	7	8
A	B	C	D	E	--	--	--

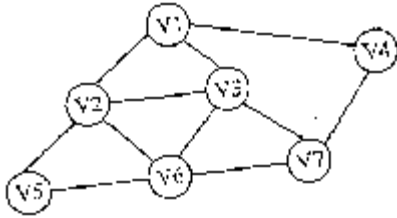
3. Write algorithm (Recursive) for Inorder Traversal Method.
4. Draw Expression tree for  $P * Q / R \div S$ .
5. Draw all possible tree with Three nodes.
6. Draw different representation of Tree.
7. Give Preorder Traversal of following Tree



8. Draw Ordered Binary tree of following Data  
 12, 3, 2, 34, 23, 9, 1

Answer following (Any Two)

1. Explain DFS with proper diagram and Algorithm.
2. What is Spanning Tree? Explain DFS Spanning Tree with diagram. Draw DFS and BFS Spanning Tree of following Graph.



3. Define following Terms(With Proper Diagram)

Graph	Loop
Node Simple Path	Cycle
Complete Graph	Parallel Edges
Mixed Graph	