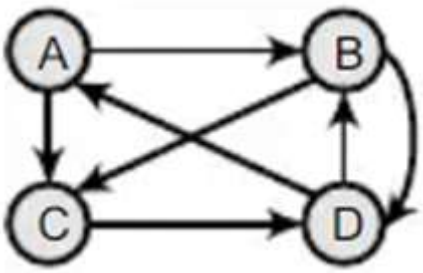
Duration: 3hrs **[Max Marks:80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required, and state it clearly.

1 **Attempt any FOUR** [20]

a List different data structures along with one application?

b Find adjacency matrix A and adjacency list for the following directed graph.



c Compare between Bubble sort and insertion sort with an example.

d Convert following expression to postfix
(f-g)*((a+b)*(c-d))/e

e Explain types of queues with examples?

2 a Write a program in 'C' language for quick sort algorithm? [10]

b Explain the properties of Binary Search Tree. Create a binary search tree using the following data elements: [10]
45,28,34,63,87,76,31,11,50,17

3 a Explain possible operations on doubly linked list and write algorithm to display list? [10]

b Explain stack overflow and underflow conditions with suitable example? [10]

4 a Write an algorithm to check the well-formedness of parenthesis? [10]

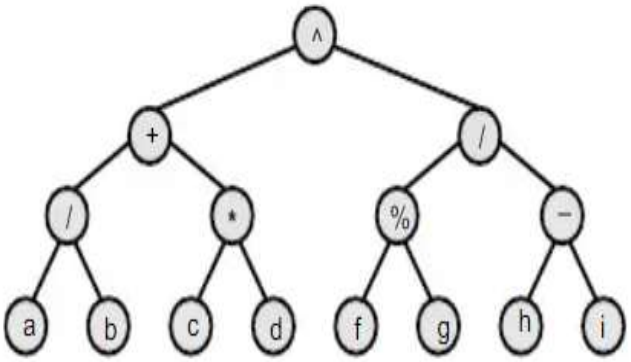
b Explain Singly linked list? State advantages and applications of Linked List? [10]

5 a Explain how element 29 can be searched in the given array using the Binary search algorithm. Write algorithm for the same. [10]
5, 9, 11, 15, 25, 29, 30, 35, 40.

b Write a function in C for DFS traversal of graph. Explain DFS graph traversal with suitable example? [10]

6 **Attempt ALL** [20]

a Write down the expression that it represented by following binary tree.



b What is hashing? Explain hash collision with example?

c List practical applications of stack and queues?

d Differentiate between static arrays and dynamic arrays.

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