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 Explain ADT. List linear and nonlinear data structures with examples.
  b Write an algorithm to check for balanced parentheses in an expression using stack.
  c Write a short note on the expression tree
  d What are the different collision avoidance techniques? Explain
  e What are the different ways of representing a graph data structure on a computer?

2 a Write an algorithm to implement a queue using Arrays. Write a function for Enqueue, Dequeue, and display. [10]
  b Given the postorder and inorder traversal of a binary tree, construct the original tree. Postorder: D E F B G L J K H C A Inorder: D B F E A G C L J H K [10]

3 a What is hashing? What properties should a hash function demonstrate? [10]
  b Write an algorithm to implement a stack using a linked list. [10]

4 a Consider the following sorted array DATA with 13 elements: 11, 22, 30, 33, 40, 44, 55, 60, 66, 77, 80, 88, 99 Illustrate the working of binary search technique while searching an element (i) 44 (ii) 100 [10]
  b What is a Binary search tree? Explain different traversal techniques of binary tree. [10]

5 a Explain insertion sort using an example. Write an algorithm for it and comment on its complexity [10]
  b Write short notes on BFS and DFS algorithms. [10]

6 a Differentiate between arrays and linked lists. What are the different types of a linked list? Write pseudocode to show creation of the node and deletion of the node in the beginning of the list. [10]

  b Write a short note on the implementation of the Huffman tree. [10]

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