

**Duration: 2 hrs**

**[Max Marks:60]**

- 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 THREE** [15]
- a     Explain linear and nonlinear data structures with suitable examples. [5]
- b     Define ADT. Write ADT for Queue data structure. [5]
- c     Differentiate between Linked List and array. [5]
- d     Write an algorithm for reversing a string. [5]
- 2    a   Write an algorithm to implement Stack using an array. [8]
- b   Write a algorithm to reverse the singly linked list. [7]
- 3    a   Write a algorithm to implement circular queue using an array. [8]
- b   Design a Huffman tree for the word “CONSTRUCTION”. Also write the Huffman code to represent each symbol. [7]
- 4    a   Construct a Binary Search Tree for given numbers 45, 23, 76, 11, 30, 60, 90, 25, 50, 65. [8]
- b   Write an algorithm for infix to postfix conversion. Convert the following expression to postfix  $(A + B) * C - D / E$  [7]
- 5    a   Write an algorithm to implement singly linked list that performs the following functions [8]
1. Insert a node in the beginning  
      2. Insert a node in the end  
      3. Display the linked list elements
- b   Draw the Stack structure for each case when the following operations are performed on an empty stack. [7]
1. PUSH A, B, C, D, E, F  
      2. POP two letters  
      3. PUSH G  
      4. POP one letter  
      5. POP four letters  
      6. Pop one letter  
      7. PUSH I, J  
      8. POP one letter
- 6      **Write short notes on (any 3)** [15]
- a) Doubly Linked List [5]  
b) Double Ended Queue [5]  
c) Types of Binary Tree [5]  
d) Priority Queue [5]

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