

(Time: 3 Hours)

[Total Marks: 80]

N.B.: (1) Question No.1 is compulsory.

(2) Attempt **any three** out of remaining questions.

(3) Assume Suitable data if necessary.

(4) **Figures** to the **right** indicate full **marks**.

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| 1. | (a) | What are the applications of Stack? | 3 |
| | (b) | What are the advantages of circular linked list? | 3 |
| | (c) | Differentiate between space complexity and time complexity. | 3 |
| | (d) | Explain linear and non linear data structures. | 2 |
| | (e) | What is expression tree? Give Example. | 3 |
| | (f) | Explain asymptotic notations. | 3 |
| | (g) | What is recursion? State its advantages and disadvantages. | 3 |
| 2. | (a) | Write an algorithm for converting infix to postfix expression. | 10 |
| | (b) | Explain BFS and DFS algorithm with examples. | 10 |
| 3. | (a) | Write an algorithm for following operations on singly linked List
(1) Insertion
(2) Deletion
(3) Traversal | 10 |
| | (b) | Write an algorithm for implementing stack using array. | 10 |
| 4. | (a) | Explain the properties of Binary search tree. Construct Binary search tree for following elements:
47,12,75,88,90,73,57,1,85,50,62 | 10 |
| | (b) | Explain Quick sort using an example. Write algorithm for it and comment on its complexity. | 10 |

5. (a) What is collision? What are the methods to resolve collision? Explain Linear probing with an example. 10
- (b) Write an algorithm for merge sort and comment on its complexity. 10
6. (a) Write an algorithm for implementing Queue using array. 10
- (b) What is Minimum Spanning Tree? Draw the MST using kruskal's and prim's algorithm and find out the cost with all intermediate steps. 10


