

- NOTE:** 1. Figure should be neat and labelled
 2. All questions are compulsory
 3. Right side indicates marks

[20 marks]

Q.1 Answer the following. (Attempt Any 4)

- Write short note on time and space complexity?
- Explain in detail N-Log-N and Quadratic function?
- Write short note on theta notation?
- Explain in detail precondition and post condition regarding ADTS?
- Write a program to match parenthesis in an expression using stack.
- Write short note on Dynamic programming problem solving method?
- List different counting primitive operations?
- Explain in detail evaluation postfix expression?

[20 marks]

Q.2 Answer the following. (Attempt Any 4)

- Write program to implement Queue?
- Write a program for deletion of a node at front of single linked list?
- Explain in detail circular linked list?
- Write short on trees and explain their properties?
- Explain following concepts of binary trees
 - Tree Size
 - Depth
 - Height
 - Width
 - Size
- Write an algorithm for insertion of element at the head of a Single Linked List?
- Write a program for insertion of a node in a Tree?
- Write a program to simulate stack using Linked List?

Q.3 Answer the following. (Attempt Any 4)

[20 marks]

- Explain post order traversal with its algorithm?
- Write a program to implement Breadth First traversal in tree?
- Explain in details data structures for graphs?
- Explain in detail adjacency matrix in graph?
- Write short on the Map ADTS?
- Write an algorithm for Dijkstra's algorithm to find shortest path?
- List the problems of reachability in graph?
- Write a program to implement adjacency list structure in graph?

4 Answer the following. (Attempt Any 3)

[15 marks]

- a) Explain best case, worst case, and average case regarding algorithm analysis?
- b) Write a program to implement different methods of stack?
- c) Write a program for insertion of node in Double Linked List?
- d) Explain in detail Binary trees?
- e) Explain the following behaviors of Maps
 - i. M.get(k,d=None)
 - ii. M.keys()
 - iii. M.clear()
 - iv. M.popitem()
 - v. M.items()
- f) Write a program to implement inorder tree traversals?

— The End —