

(3 hours)

[80 marks]

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

- (2) Attempt any three questions from remaining questions.
- (3) Assume suitable data if necessary.
- (4) Figure to right indicate full marks.

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| Q.1 | a) What are linear and non-linear data structures. | 2 |
| | b) What is expression tree. Give examples. | 3 |
| | c) Define Graph. List its type with examples. | 3 |
| | d) Define Doubly-Ended queue and list the variants of Doubly Ended Queue. | 3 |
| | e) What do you mean by asymptotic notations? Explain with the help of example | 3 |
| | f) What is the depth, height and degree of a Binary tree. | 3 |
| | g) What is recursive function? Explain how it works using proper example. | 3 |
| Q.2 | a) Write a program for implementing STACKS using Arrays. | 10 |
| | b) Write a program for INSERTION sort and comment on its complexity. | 10 |
| Q.3 | a) Write a program to convert INFIX expression to POSTFIX Expression. | 10 |
| | b) Write a program for Implementing QUEUE using linked list. | 10 |
| Q.4 | a) Write the algorithm for deletion of a node in a Binary Search Tree. Consider all cases. | 10 |
| | b) Explain Linear Search and Binary Search with an example. | 10 |
| Q.5 | a) Write an algorithm for insertion and traversal in a circular linked list. | 10 |
| | b) Define AVL Tree? Create an AVL tree using the following sequence | 10 |
| | 1,2,3,4,5,6,7,8,9,10 (Mention type of rotation for each case.) | 20 |
| Q.6 | Write short note on (any four) | |
| | a) Graph traversal algorithms | |
| | b) Priority Queue. | |
| | c) Red-Black Trees. | |
| | d) B-Tree | |
| | e) Euclid's Algorithm | |
