

Time: 2½ hrs.

Note:

1. All questions are compulsory with internal choice.
2. Draw neat diagrams wherever necessary.
3. Figures to the right indicate full marks.

Q.1

Answer the following (any three)

(15)

- (a) Define algorithm. Explain complexity of algorithm.
- (b) Define Array. How array is declared in C++? Write algorithm/code snippet(C/C++) for traversing Array.
- (c) Write a note on classification of Data Structure.
- (d) Write an algorithm/code snippet for binary search on an Array.
- (e) Write an algorithm/code snippet(C/C++) for inserting elements into an Array.
- (f) Write an algorithm/code snippet for linear search on an Array.

Q.2

Answer the following (any three)

(15)

- (a) What is Linked List? What are the advantages of Linked List over Array? How is LinkedList stored in memory?
- (b) Explain different types of Linked List.
- (c) What is Sparse Matrix? How Sparse Matrix is represented using Linked List.
- (d) Write an algorithm/code snippet(C/C++) to delete specific node from Singly Linked List.
- (e) Write an algorithm/code snippet(C/C++) to append node in Doubly Linked List.
- (f) Write an algorithm/ code snippet(C/C++) to display Doubly Linked List in forward and backward direction.

Q.3

Answer the following (any three)

(15)

- (a) What is Stack? Explain important terminologies used in Stack along with example.
- (b) What is Queue in Data Structure? Differentiate between Linear Queue and Circular Queue.
- (c) What are different applications of Stack Data Structure?
- (d) Write an algorithm/code snippet(C/C++) for enqueue on Circular Queue.
- (e) Write an algorithm/code snippet(C/C++) for dequeue on Linear Queue.
- (f) Write an algorithm/code snippet(C/C++) for evaluation of postfix expression using Stack.

Q.4

Answer the following (any three)

(15)

- (a) What are different methods of Binary Tree traversal? Explain with example.
- (b) What is Heap Tree? Build a Max Heap and Min Heap Tree with following values: 3,1,6,5,2 and 4.
- (c) What is AVL Tree? Explain different types of rotation in AVL Tree with example.
- (d) Write an algorithm/code snippet(C/C++) for bubble sort.
- (e) Write an algorithm/code snippet(C/C++) to create Binary Search Tree.
- (f) Create a Huffman Tree and find Huffman codes for each character in the string "CONNECTION".

Q.5

Answer the following (any three)

(15)

- (a) What is Graph? Explain different representation of Graph with example?
- (b) What is collision in Hashing? Explain Separate Chaining with example.
- (c) What is Spanning Tree? What are general properties of Spanning Tree. Write any two applications of Spanning Tree.
- (d) Use Floyd-Warshall Algorithm to get all-pair shortest path for following Graph. Show the final Distance Matrix.