

(3 Hours)

[Total Marks: 80]

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

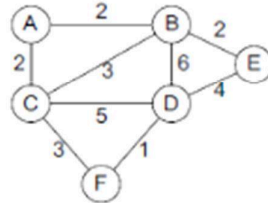
(2) Attempt **any three** out of remaining questions.

(3) Assume Suitable data if necessary.

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

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|----|-----|--|----|
| 1. | (a) | Explain different types of queues in data structures.  | 3  |
|    | (b) | How does binary search different from linear search?   | 3  |
|    | (c) | Explain Doubly Linked List.  | 3  |
|    | (d) | Define graph and list any three applications of graph.   | 3  |
|    | (e) | Write postfix form of the following infix expression.<br>$A+(B*(C-D)/E)$   | 3  |
|    | (f) | Explain linear and nonlinear data structures.  | 2  |
|    | (g) | Write a note on recursion.   | 3  |
| 2. | (a) | Explain Binary search tree. Construct Binary search tree for following elements:<br><b>45, 39, 56, 12, 34, 78, 32, 10, 89, 54, 67, 81</b>  | 10 |
|    | (b) | What is Singly Linked List? Write an algorithm to implement following operations on Singly linked List.<br>(1)Insertion(All cases)<br>(2)Deletion(All cases)<br>(3)Traversal             | 10 |
| 3. | (a) | Write an algorithm for implementing stack using array.   | 10 |
|    | (b) | Write an algorithm for merge sort and comment on its complexity.   | 10 |
| 4. | (a) | Construct the binary tree for Inorder and Preorder traversal sequence given below<br>Inorder: DBEAFCG<br>Preorder: ABDECFG<br>Write a function to traverse a tree in Postorder sequence. | 10 |
|    | (b) | Write an algorithm for quick sort 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) 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**



6. Write short notes on **(Any 4)** **20**
- a) Asymptotic notations
  - b) Double Ended Queue(De-Queue)
  - c) Insertion Sort
  - d) DFS and BFS
  - e) Expression Tree.

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