(3 Hours) [Marks: 80]

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

2) Answer any three out of remaining questions.

3) Assume suitable data if necessary.

4) Figures to the right indicate full marks.

Q1. (a) Define graph. List types of graphs with example. **(5)**

(b) Explain asymptotic notation. **(5)**

(c) Convert given infix expression to equivalent postfix expression A+(B*(C-D)/E)) **(5)**

(d) Define minimum spanning tree with example. **(5)**

Q2. (a) What is singly linked list? Write an algorithm to perform following operation of singly linked list

1. Insertion Operation (From Specific Position of Linked List and From End of Linked List)

2. Deletion Operation (End of Linked List) **(10)**

Q2. (b) Write an algorithm for implementation of queue using an array. **(10)**

Q3. (a) Explain Binary Search Tree. Construct Binary Search Tree from given numbers 45, 15, 79, 90, 10, 55, 12, 20, 50,73,50,16,61 **(10)**

Q3. (b) Write an algorithm for implementation of stack using an array. **(10)**

Q4. (a) Define AVL tree. Construct AVL tree for following mentioned data (Mention types of rotations for each case) 21,26,30,9,4,14,28,18,15,10,2,3,7 **(10)**

Q4. (b) Write an algorithm for implementation of quick sort. Comment on its time Complexity. **(10)**

Q5. (a) What is Collision? What are the methods to resolve collision? Explain quadratic Probing with and example. **(10)**

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Q5. (b) What is Minimum Spanning Tree? Draw the MST using Prim's and Kruskal's Algorithm. (Find out cost of all intermediate steps) **(10)**
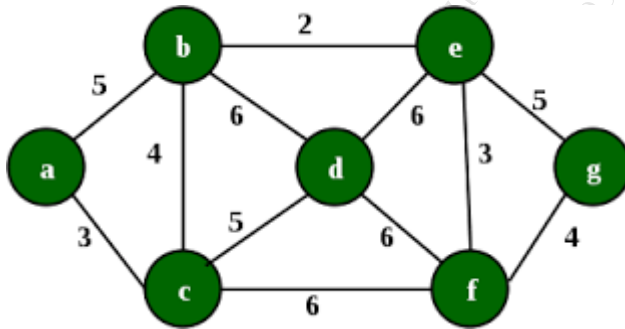
Q6. Solve any Four: **(20)**

  a) Doubly Linked List

  b) Expression Tree

  c) Merge Sort

  d) Double Ended Queue

  e) Dijkstra's Algorithm

  f) DFS and BFS

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