

**[Total Marks: 100]**

**(3 Hours)**

- N.B. :**
- 1) Question No.1 is **compulsory**.
  - 2) Attempt any **four** from the remaining questions.

1. (a) Write an algorithm for the following (10)
  - i. Insert a node in sorted Linked List
  - ii. Delete first node from the Linked List.
1. (b) What is a stack? Give algorithm to push and pop element in stack. List the applications of stack. (10)
2. (a) In order and post order traversal of a binary tree are as follows (10)
 

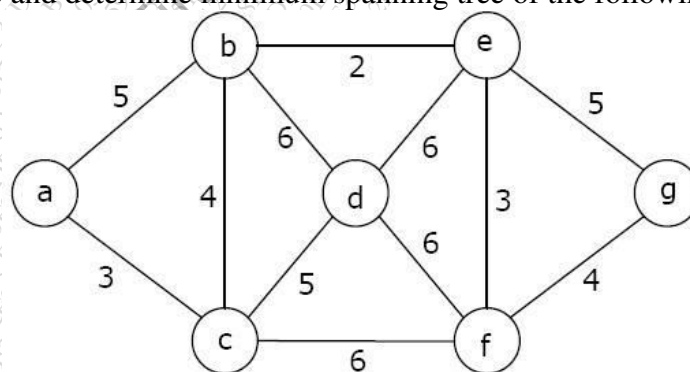
Preorder      ABDG CEHIF

Inorder      DGBAHEICF

Show a step wise reconstruction of the binary tree
2. (b) For circular queue write algorithms to (10)
  - i. Insert an element in the queue
  - ii. Search for an element in the queue
3. (a) Write Short notes on (10)
  - i. Analysis of Algorithm
  - ii. Priority Queue
3. (b) Consider the following list of numbers- 67, 12, 89, 26, 38, 45, 22, 79, 53, 9, 61 (10)
 

Sort these numbers using heap sort
4. (a) What is minimum spanning tree? Write Kruskal's algorithm to find minimum (10)
 

spanning tree and determine minimum spanning tree of the following graph

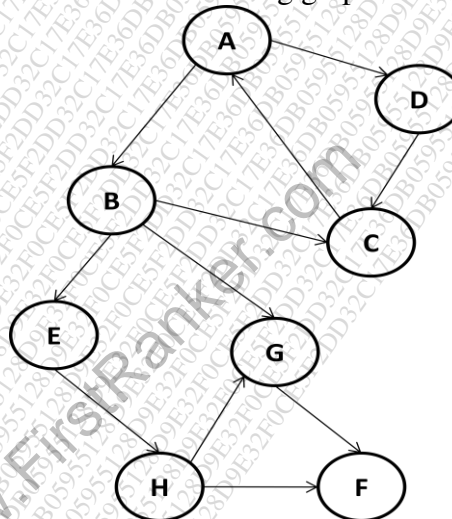


4. (b) Explain Graph and its terminology also explains in brief adjacency matrix and adjacency list for Graph Storage. (10)
5. (a) What is Huffman Coding? Given the set of symbols and corresponding (10)

frequency table as below, explain the steps to find Huffman Code

Symbol	A	B	C	D	E
Frequency	20	10	10	30	30

5. (b) Hash the following in a table of size 11. Use linear probing and quadratic probing collision resolution techniques: (10)  
23, 55, 10, 71, 67, 32, 100, 18, 10, 90, 44.
6. (a) Define B-tree. Construct B-tree of order 4 with following data (10)  
5, 3, 21, 9, 1, 13, 2, 7, 10, 12, 4, 8
6. (b) Write a short note on (10)
  - i) Binary Search Tree
  - ii) Doubly linked list
7. (a) What is AVL tree? Construct AVL tree for the following data. Mention the type of rotation for each case. 50, 25, 10, 5, 7, 3, 30, 20, 8, 15 (10)
7. (b) Give BFS and DFS traversal of the following graph (10)



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