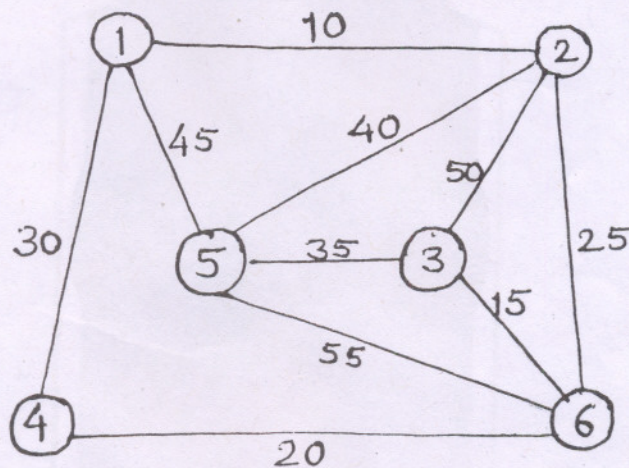


(3 Hours)

[Total Marks 100

N.B. :- (1) Question No. 1 is **compulsory**.(2) Answer any **four** out of remaining **six** questions.(3) **All Programs** are to be written in **JAVA** only.

1. (a) What is Recursion ? Give disadvantages of recursion. Write a program to implement Tower of Hanoi. 10
- (b) Explain Asymptotic Notations (O , Ω , θ) and write the properties of asymptotic notations. 5
- (c) Explain packages and how do we hide classes using packages. 5
2. (a) Write a program to implement Quick sort and comment on its complexity. 10
- (b) Write an algorithm for binary search method with example. 6
- (c) Explain vectors with at least five methods. 4
3. (a) Write a program to implement Circular queue using array. 10
- (b) Explain Huffman Algorithm. Construct Huffman tree for "MALAYALAM" with its optimal code. 10
4. (a) Write an algorithm to traverse a graph using – (with example)– 10
 - (i) Breadth First Search
 - (ii) Depth First Search.
- (b) Implement the function to delete a node from Binary Search Tree. 10
(consider all possible cases)
5. (a) Draw the minimum cost spanning tree using Kruskal's algorithm. Also find its cost with all intermediate steps. 10



- (b) Write a program to implement STACK using Linked List. 10
6. (a) Explain in brief– 10
 - (i) Ascending heap
 - (ii) Desending heap.
 Write a program to implement heap sort.
- (b) What is hashing ? Explain Hashing methods and collision avoiding techniques. 10

7. Write short notes on any **four** of the following with example –

20

- (a) AVL Trees
 - (b) B-Tress
 - (c) Shortest Path Algorithm.
 - (d) Pattern matching.
 - (e) Comparision of sorting Algorithms.
 - (f) Expression and realization of ADT's in JAVA.
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