DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
SECOND SESSIONAL
SUBJECT: (CE-316) Data Structure and Algorithms

Examination	: B.Tech Semester III	Seat No.	: 31
Date	: 04/09/2023	Day	: Monday
Time	: 11:00 AM to 12:15 PM	Max. Marks	: 36

INSTRUCTIONS:
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

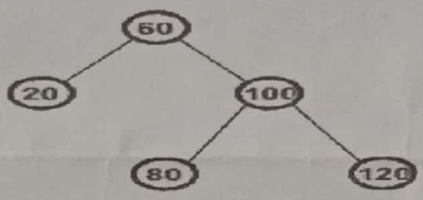
Q.1 **Do as directed.**

CO3 U (a) Construct a binary tree whose preorder traversal is: KLNMPRQST and inorder traversal is: NLKPRMSQT.

CO1 C (b) Consider the following table and construct the Binary Tree by following Huffman Coding method. Also Generate the codes for the characters.

Character	m	p	s	i
Frequency	1	2	4	4

CO3 C (c) Consider the following AVL Tree. Draw an updated AVL tree after insertion of 110. Show necessary steps.



CO1 R (d) Define: Multistage Graph and Weighted Graph

CO1 U (e) For an n-gon where all distances are 10, what is the cost of minimum spanning tree?

CO3 R (f) Compare Prim's Algorithm with Kruskal's Algorithm.

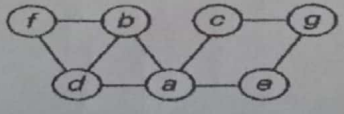
Q.2 Attempt ***Any TWO*** from the following questions.

CO3 N (a) One can model a maze by having a vertex from starting point, a finishing point, dead ends, and all the points in the maze where more than one path can be taken, and then connecting the vertices according to the paths in the maze.

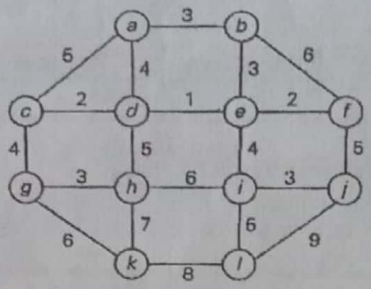
a. Construct such a graph for the following maze.

b. Which traversal---DFS or BFS--- would you use if you found yourself in a maze and why?

CO3 C (b) Construct Depth First Spanning Tree having root as node 'a'. Follow lexicographical (alphabetical) order during DFS. Find Articulation Points from the Given Graph. Show necessary steps.



CO3 C (c) Apply Dijkstra's Algorithm to find the shortest path to all the nodes starting from node 'a'. Show necessary steps. [6]



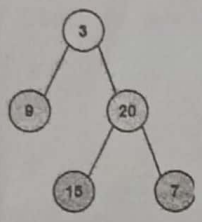
Q.3 Attempt the following questions. [12]

CO3 N (a) Write a C/C++ program to find the minimum depth of a binary tree. [6]

CO3 C (b) Write an iterative algorithm to Delete a given key in the Binary Search Tree, if the key is present. (**Note:** Algorithm based on swapping the key/value is not allowed). [6]

OR

CO3 N (a) Given a root of a binary tree, write a C/C++ program to return the level order traversal of its nodes' values in form of array of arrays as shown in below example. [6]




```
Output: [[3],[9,20],[15,7]]
```

CO3 C (b) Write and explain an iterative algorithm to do Pre-order Tree Traversal of Binary-Tree. [6]