# Tribhuvan University

## Faculty of Humanities & Social Sciences

## OFFICE OF THE DEAN

## 2023

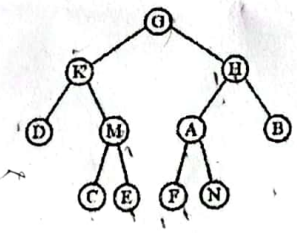
**Bachelor in Computer Applications** | **Full Marks: 60**
**Course Title: Data Structure and Algorithms** | **Pass Marks: 24**
**Code No: CACS 201** | **Time: 3 hours**
**Semester: III** | **Batch: 2021**

**Candidates are required to answer the questions in their own words as far as possible.**

### Group B

**Attempt any SIX questions.** **[6×5 = 30]**

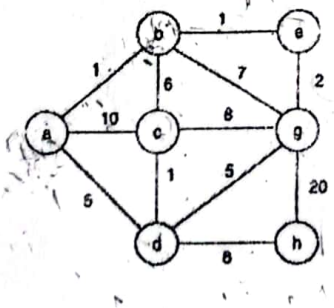
2. Define stack. Why stack is considered as an ADT? List any four applications of stack. [1+2+2]
3. Evaluate the following postfix expression using the stack: 4 5 + 7 3 - 2 + * [5]
4. What is tower of Hanoi problem? How recursion can be used to solve tower of Hanoi problem? [2+3]
5. Define hashing. Explain how to resolve collisions during hashing using open-addressing. [1+4]
6. What is binary search? Trace the algorithm of binary search to search a key 12 in the data: 11, 19, 5, 2, 7, 21, 8, 21, 12 [1+4]
7. What is big-oh notation? Explain about divide and conquer strategy with example. [2+3]
8. What are the depth and degree of a node in a tree? Perform pre-order, in-order and post-order traversal of the following tree: [2+3]




### Group C

**Attempt any TWO questions.** **[2×10 = 20]**

9. How dynamic implementation of the queue can be done? Explain with algorithm. Also explain how insertion and deletion of a node can be done at the end of a singly linked list with algorithm. [5+5]
10. Define complete binary tree and skewed tree. Write a function to implement heap sort and sort the following data using heap sort: 12, 9, 1, 13, 16, 2, 4, 21, 5 [2+4+4]
11. How breadth first traversal and depth first traversal can be used for traversing a graph? Explain with example. Use Dijkstra's algorithm to find the shortest path from node A to all other nodes for the following graph. [5+5]

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