

Only for 2021
to 2024 AD
admitted
Students

TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean
May 2026

Full Marks: 60
Pass Marks: 30
Time: 3 Hrs.

BIM / Third Semester / IT 238: Data Structure and Algorithms

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

Group "A"

Brief Answer Questions:

[10 × 1 = 10]

1. Define computational complexity.
2. Why doubly linked list needs more memory?
3. List any two applications of queue.
4. What is excessive recursion?
5. What is the basic difference between tree and graph?
6. Write two major operations of stack.
7. Mention the worst case while creating BST.
8. Define hash collision.
9. Why do we need to sort the data?
10. Define weighted graph.

Group "B"

Short Answer Questions: (Attempt any FIVE Questions)

[5 × 3 = 15]

11. Why do we need ADT? Justify.
12. Convert the infix expression $(X+Y)*Z$ into postfix expression.
13. Write a function to traverse a binary tree in Postorder.
14. Write an algorithm or function to pop an element from a stack.
15. Write recursive function to find the GCD of two positive integers.
16. How do you traverse a graph? Illustrate any one.

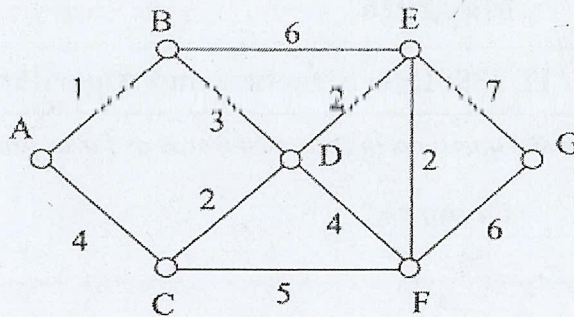
Group "C"

Long Answer Questions: (Attempt any THREE Questions)

[3 × 5 = 15]

17. Explain different cases of deleting a node from a binary tree.
18. Using quick sort, arrange the data 2, 1, 6, 10, 9, 4, 8, 7, 5 in ascending order.
19. Write an algorithm or function to add a node at the end of doubly linked list.

20. Find the shortest paths from vertex A to other vertices of the below graph using Dijkstra's algorithm:



h(0) = 20

Group "D"

Comprehensive Answer / Case / Situation Analysis Questions:

[2 × 10 = 20]

21. List the advantages of circular queue over linear queue. Insert 39, 55, 10, 29, 19, 15 into a Hash table of size 10 using division function. Use linear probing technique to resolve hash collision(if necessary).
22. Why do we need to balance BST? Support your statement with an example. Create a B-tree of order 5 from the given data: 7, 6, 1, 2, 11, 4, 8, 13, 10, 5, 19, 9, 18, 24.



$H = 0, L = 1$
 $h = 0, h = 0$

Since, cell address of value is sorted
 we to

$h(x)$