

**MASTER OF COMPUTER
APPLICATIONS / BACHELOR OF
COMPUTER APPLICATIONS
(MCA/BCA)**

**Term-End Examination
December, 2024**

MCS-021 : DATA AND FILE STRUCTURES

Time : 3 Hours

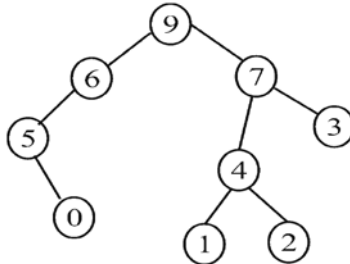
Maximum Marks : 100

Weightage : 75%

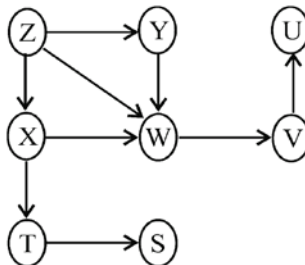
Note : *Question No. 1 is compulsory. Attempt any **three** questions from the rest. All algorithms should be written near to 'C' language.*

1. (a) Write an algorithm that accepts two polynomials as input and computes the output as an addition of these polynomials. 10
- (b) What is a circular linked list ? Write an algorithm to create a circular linked list and delete an element from it. 10
- (c) What is a linear search ? Write an algorithm for linear search and find its complexity. 10

- (d) Write an algorithm to implement PUSH and POP operations in a stack using linked list. 10
2. (a) What is a queue ? Explain Insert and Delete operations of queue with the help of algorithms for each operation. 10
- (b) Write an algorithm for the implementation of a Binary Tree. 10
3. (a) Traverse the following Binary Tree in inorder, pre-order and post-order traversal : 10



- (b) Traverse the following diagram using Breadth First Search (BFS) and Depth First Search (DFS) : 10



4. (a) Write Dijkstra's algorithm to find shortest route in a graph. Explain the algorithm in terms of its complexity. What are its applications ? 10

- (b) Explain two-way merge sort algorithm. Sort the following set of data using this algorithm. Show intermediate steps of sorting : 10

8 6 0 4 1 9 7 3

5. (a) What is a Red-Black Tree ? Explain how it is different from a Binary Search Tree. 10

- (b) Define Indexed sequential file organization. Compare two approaches—static *vs.* dynamic to implement indexes with explanation. 10

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