PG – 667

I Semester M.C.A. (Two Years Course) Examination, May/June 2025
(CBCS) (2020 – 21 and Onwards)
COMPUTER SCIENCE
1MCA6 : Data Structures

Time : 3 Hours Max. Marks : 70

Instruction *: Answer* ***all*** *the Sections.*

SECTION – A

Answer **any five** of the following. **Each** question carries **six** marks. **(5×6=30)**

1. Explain different types of data structures.
2. Explain the significance of time complexity and space complexity of an algorithm.
3. What is a Sparse Matrix ? Write a C program to check whether a matrix is a triangular Sparse Matrix or not.
4. Explain different type of linked lists.
5. Briefly explain height-balancing in AVL trees.
6. What is topological sorting ? Elaborate.
7. What is divide and conquer method ? Explain.
8. Write a program to sort n numbers using merge-sort.

SECTION – B

Answer **any four** of the following. **Each** question carries **10** marks. **(4×10=40)**

9. What is an asymptotic notation ? Explain different types of asymptotic notations.
10. a) Convert the following infix notation expression to postfix notations
    $(x + y)/(p - q) - f*e$ **6**
    b) Explain underflow and overflow conditions with respect to stack and queues. **4**
11. Define Binary Search Tree. Construct binary search tree for the given data. Write the outcome of three tree traversal on the constructed BST.
12. Write functions for the following operations using singly linked list.
    i) Insertion at beginning
    ii) Deletion of first node
    iii) Search a given key in a list.
13. Write selection sort algorithm and trace it for the given data.
    150, 30, 60, 95, 7, 80, 50, 100.
14. Define Hashing. Explain hashing techniques and techniques for collision resolution.
