

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

THIRD SEMESTER INTEGRATED M.C.A DEGREE EXAMINATION (R), DECEMBER 2022 (2020 SCHEME)

Course Code: 20IMCAT209

Course Name: Data Structures

Max. Marks: 60

Duration: 3 Hours

PART A

(Answer all questions. Each question carries 3 marks)

1. Define time complexity and space complexity.
2. What do you mean by abstract data type (ADT)?
3. Explain 2D array and its memory representation.
4. Write an algorithm for insertion sort.
5. Point out any three advantages of linked list over arrays.
6. Write an algorithm to search an element in a singly linked list.
7. Define stack. Explain the push and pop operations.
8. List any two applications for stack and queue.
9. Show the array and linked representation of binary tree.
10. Define AVL tree.

PART B

(Answer one full question from each module, each question carries 6 marks)

MODULE I

11. Explain the asymptotic notations used to analyze an algorithm. (6)

OR

12. Compare and contrast linear data structures and nonlinear data structures. (6)

MODULE II

13. Explain binary search algorithm with an example. (6)

OR

14. With an example, explain merge sort algorithm. (6)

MODULE III

15. Distinguish singly linked list and doubly linked list. (6)

OR

16. Explain insertion and deletion operations in a circular linked list. (6)

MODULE IV

17. Write an algorithm to convert an infix expression into postfix notation with an example. (6)

OR

18. Describe insertion and deletion in the circular queue. (6)

MODULE V

19. With an example, describe breadth-first search and depth-first search. (6)

OR

20. Write a short note on inorder, preorder, and post order tree traversal techniques. (6)
