Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

THIRD SEMESTERINTEGRATED M.C.A DEGREE EXAMINATION (R), FEBRUARY 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. Discuss about algorithm and its characteristics.
2. Define the term data structure and compare linear data structure and nonlinear data structure.
3. What do you mean by searching? List the popular searching techniques.
4. How is matrix represented in memory?
5. Compare the terms arrays and linked list with example.
6. Describe the concepts of circular linked list and discuss any two basic operations in circular linked list.
7. Illustrate the term stack and its operations.
8. Write an algorithm for converting infix expression into postfix expression.
9. Discuss about graphs and explain degree of a vertex.
10. Define the term AVL Tree.

PART B

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

MODULE I

11. a) Explain performance analysis of algorithms. (3)
    b) Explain the asymptotic notations used while analyzing an algorithm. (3)

OR

12. Discuss the different operations in data structures. (6)

MODULE II

13. How do you implement the concepts of arrays in bubble sorting? Explain. (6)

OR

14. a) Describe insertion sort algorithm with an example. (4)
    b) Mention the disadvantages and complexities of insertion sort. (2)

MODULE III

15. Explain the concepts of singly linked list and illustrate the basic operations with algorithm and examples. (6)

OR

16. a) What is doubly linked list? (2)
    b) Write the different types of insertion and deletion operations in doubly linked list with example. (4)

MODULE IV

17. a) Explain the concept of stacks and its implementation. (3)
    b) Discuss about the evaluation of postfix expression using stack with an example. (3)

OR

18. a) Illustrate queue with example. (2)
    b) Explain circular queue and deque with algorithm. (4)

MODULE V

19. a) Write short notes on graph traversal techniques. (6)

OR

20. a) Define binary tree with example. (2)
    b) Explain any two operations on a binary tree with algorithms. (4)

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