Register No.:   ....   Name: ....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

THIRD SEMESTER INTEGRATED MCA DEGREE EXAMINATION (R), DECEMBER 2023
(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.   Briefly explain the concept of Abstract Data Type.
2.   List the properties of a good algorithm.
3.   Write the row major representation for a 2X2 matrix.
4.   Write an algorithm for performing linear search in an array.
5.   Differentiate array and linked list.
6.   Give an algorithm for creating a circular linked list.
7.   List any six applications of stack.
8.   Enumerate any three differences between stack and queue.
9.   Write short note on two types of representation of a graph.
10. How does a recursive algorithm work?

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

MODULE I

11.   Elaborate on the asymptotic notations used for analyzing algorithms.   (6)

OR

12.   What is data structure? Explain the various operations performed on a data structure.   (6)

MODULE II

13.   Write an algorithm for multiplying two matrices. Explain with an example.   (6)

OR

14.   Illustrate the algorithm for performing quick sort. Mention the worst case and best case complexities.   (6)

MODULE III

15. What are the operations performed on a singly linked list? Write an algorithm to traverse singly linked list. (6)

OR

16. Write the algorithm for creating a doubly linked list and inserting an element at given position. (6)

MODULE IV

17. Convert the following infix expression to postfix expression using tabular method. (6)
    K + L - M*N + (O^P) * W/U/V * T + Q

OR

18. Explain the dynamic implementation of queue. (6)

MODULE V

19. With an example explain the BFS for graph traversal. (6)

OR

20. Give the in-order, preorder and post-order traversal for the given binary tree.

(6)

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