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

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER INTEGRATED MCA DEGREE EXAMINATION (R,S), MAY 2024

(2020 SCHEME)

Course Code: **20IMCAT308**

Course Name: **Design & Analysis of Algorithms**

Max. Marks: **60** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. Define algorithm and its properties.
2. What do you mean by the time complexity of an algorithm? Explain with an example.
3. Write an algorithm to solve minimum cost spanning tree using Prim's method.
4. Explain quick sort with an example.
5. Differentiate divide and conquer method with dynamic programming.
6. State the principle of optimality.
7. Write the control abstraction for backtracking.
8. Explain sum of subset problem with an example.
9. Compare P and NP classes of algorithms.
10. Write short note on vertex cover problem with an example.

PART B

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

MODULE I

11. With suitable examples, explain various methods for solving recurrence equations. (6)

OR

12. Explain asymptotic notations and their properties with a suitable example. (6)

MODULE II

13. Analyze and explain merge sort and sort the following elements 38, 27, 43, 10. Write the merge sort algorithm. (6)

OR

14. a) Describe the Kruskal's algorithm for finding the minimum cost spanning tree. (4)
    b) Explain job sequencing problem. (2)

MODULE III

15. a) Explain all pairs shortest path problem with an example. (4)
    b) What is dynamic programming? (2)

OR

16. Explain travelling salesman problem with an example. (6)

MODULE IV

17. Illustrate N^2-1 puzzle problem. (6)

OR

18. Write an algorithm to solve N Queens problem using backtracking method. Explain with an example. (6)

MODULE V

19. Explain the different types of complexity classes. Give examples of NP hard and NP complete problems. (6)

OR

20. Justify the clique problem as an optimization problem and as a decision problem. (6)

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