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

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER INTEGRATED MCA DEGREE EXAMINATION (R), MAY 2023

(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. Write an algorithm to calculate the sum of elements of a matrix. Determine its time complexity.
2. Differentiate priori and posteriori analysis of algorithms.
3. Write an algorithm to find the minimum and maximum value from a list of numbers using divide and conquer approach.
4. Explain job sequencing problem with an example.
5. Explain the characteristics of dynamic programming.
6. State the principle of optimality.
7. Define least cost (LC) search.
8. Explain the concept of state space tree.
9. Distinguish between tractable and intractable problems.
10. Write short note on clique problem.

PART B

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

MODULE I

11. List and explain various strategies for solving recurrence equations, and solve the recurrence relation using master's theorem (6)

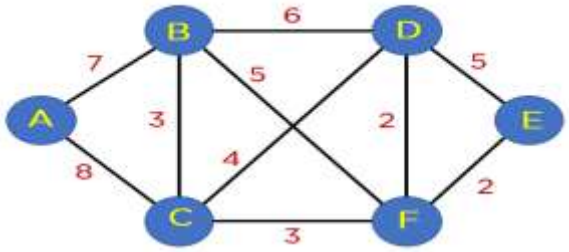
$$T(n)= 8T(n/2)+nlogn.$$

OR

12. Describe time and space complexity of an algorithm with an example. (6)

MODULE II

13. Explain Kruskal's algorithm and construct the minimum spanning tree (MST) for the given graph. (6)



OR

14. Explain the concept of merge sort algorithm with an example. (6)

MODULE III

15. Explain all pairs shortest path problem with an example. Write down the algorithm. (6)

OR

16. Solve the following travelling sales person problem using dynamic programming. Let the distance matrix be (6)

	A	B	C	D
A	0	10	15	20
B	10	0	35	25
C	15	35	0	30
D	20	25	30	0

MODULE IV

17. Explain N Queens problem and discuss the solution based on back tracking algorithm. (6)

OR

18. Explain 15 puzzle problem with an example. (6)

MODULE V

19. Describe various complexity classes. (6)

OR

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

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