K26U 0101

Reg. No. : .....

Name : .....

Sixth Semester B.C.A. Degree (CBCSS – OBE – Regular/Supplementary/ Improvement) Examination, April 2026
(2020 to 2023 Admissions)
Core Course
6B17BCA : DESIGN AND ANALYSIS OF ALGORITHM

Time : 3 Hours Max. Marks : 40

PART – A
(Short Answer)

Answer **all** the questions. **(6×1=6)**

1. Define the term 'algorithm'.
2. What does the abbreviation 'PRAM' stand for in the context of the model of computation ?
3. Define the space complexity of an algorithm.
4. Which asymptotic notation is used to represent the lower bound of an algorithm's running time ?
5. What is the primary goal of Huffman coding ?
6. Which fundamental data structure is used by Kruskal's algorithm to efficiently detect cycles when building the minimum spanning tree ?

PART – B
(Short Essay)

Answer **any 6** questions. **(6×2=12)**

7. Briefly state the primary difference between the RAM model and the PRAM model of computation.
8. In the context of the branch-and-bound technique, what is the purpose of the bounding function ?
9. Differentiate between the exploration methods of backtracking and branch-and-bound techniques.

P.T.O.

10. Explain the distinction between little oh and little omega notations.
11. Differentiate between the best case and worst case input scenarios for an algorithm.
12. State the general form of the recurrence relation that the master's theorem solves, and define the terms in it.
13. Briefly explain the underlying principle of the greedy approach as applied in Prim's algorithm.
14. How does Strassen's algorithm achieve a lower asymptotic complexity for matrix multiplication compared to the standard algorithm ?

PART – C
(Essay)

Answer **any 4** questions. **(4×3=12)**

15. Elaborate on the key assumption regarding memory access that forms the basis of the RAM Model of computation.
16. Describe the general working principle of the divide-and-conquer technique, and provide one classic algorithm that uses this approach.
17. Differentiate between the terms time complexity and space complexity.
18. Compare and contrast the iteration method and the recursion tree method for solving recurrence relations, highlighting their key differences in approach.
19. Describe the working principle of Kruskal's algorithm.
20. Trace the process of how Prim's algorithm builds the MST, starting from an arbitrary vertex, and explain the rule it uses to select the next edge.

PART – D
(Long Essay)

Answer **any 2** questions. **(2×5=10)**

21. Describe the complete steps in developing an algorithm. Explain each phase from understanding the problem to the final testing and validation.
22. Compare and contrast the greedy approach and dynamic programming.
23. Compare and contrast the concepts of Big Oh and Theta notations. Explain what type of bound each represents, how they relate to the best, average and worst-case scenarios.
24. Explain the concept of average case performance analysis.
