

**FACULTY OF ENGINEERING**  
**B.E. (IT) VI-Semester (AICTE) (Main & Backlog) Examination,**  
**September/October - 2022**  
**Subject: Design and Analysis of Algorithms**

Time: 3 Hours

(Missing data, if any, may be suitably assumed)  
**PART-A**

Max. Marks: 70

**Note: Answer all the questions**

(10 x 2 = 20 Marks)

1. Define space complexity and time complexity.
2. What is Algorithm Specification?
3. Write the Control abstraction for Divide-and conquer.
4. Write the Analysis for the Quick sort.
5. Write the difference between the Greedy method and Dynamic programming.
6. State time and space efficiency of OBST.
7. What is meant by n-queen problem?
8. Define Backtracking
9. Define NP-Complete
10. State Cook's theorem.

**PART-B****Note: Answer any five questions**

(5 x 10 = 50 Marks)

11. (a) Explain in detail about asymptotic notations with example.  
 (b) What is Hashing? Explain any five popular hash functions.
12. (a) Sort the keys using merge sort (100, 300, 150, 450, 250, 350, 200, 400, 500) show each step.  
 (b) Consider the following instance of knapsack problem  $n = 7$ ,  $m = 15$  ( $P_1, P_2, P_3, P_4, P_5, P_6, P_7$ ) = (10, 5, 15, 7, 6, 18, 3) and ( $W_1, W_2, W_3, W_4, W_5, W_6, W_7$ ) = (2, 3, 5, 7, 1, 4, 1) solve by using Greedy approach.
13. (a) Explain reliability design problem with an example.  
 (b) Write algorithm to compute lengths of shortest paths.
14. (a) Explain the Branch and Bound technique.  
 (b) Explain the graph coloring problem and write an algorithm solution using Back tracking.

15. (a) Write non deterministic algorithm for sorting.  
(b) Explain in brief NP hard and NP complete problems.

16. (a) Write Union and Find algorithms.  
(b) Write Kruskal's algorithm and explain with an example to find minimum spanning tree.

17. Write about  
(a) Hamilton cycle  
(b) Single source shortest path.

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