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**Question Paper Code : 20414**

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

Fourth Semester

Computer Science and Engineering

CS 8451 — DESIGN AND ANALYSIS OF ALGORITHMS

(Common to Computer and Communication Engineering/Information Technology)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why do we need to analyse an algorithm?
2. How do you measure and express the running time of an algorithm?
3. Define Brute Force method.
4. State the concept of divide and conquer method?
5. What are optimal binary search trees?
6. List any two major differences between Dynamic programming and Greedy method.
7. Why the maximum flow is required for iteration process?
8. List out the properties of Bipartite graph.
9. Describe about Hamiltonian circuit?
10. What do you understand by Backtracking?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the various Asymptotic notations used to analyze the time and space complexities of various algorithms. (13)

Or

- (b) Briefly discuss about mathematical analysis for recursive and non-recursive algorithms. (13)

12. (a) Write down the algorithm to construct a Convex-Hull based on divide and conquer strategy. (13)

Or

- (b) Write down the algorithm to perform Binary search with an example. (13)
13. (a) What is 0/1 Knapsack problem? Explain how it can be solved using Branch and Bound method. (13)

Or

- (b) Explain briefly about Floyd's algorithm. (13)
14. (a) Find out Maximum and Minimum values of given array using Simplex method. (13)

Or

- (b) Write the algorithm of Stable marriage problem of MEN (A, B, C) and WOMEN (X, Y, Z). (13)
15. (a) Develop an algorithm to solve Traveling Sales man problem using Dynamic Programming approach. (13)

Or

- (b) Define the P, NP and NP-complete problems and derive the relationship between them. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Sort the below numbers using merge sort and write the algorithm.  
1, 6, 3, 2, 7, 5, 8, 4 (15)

Or

- (b) Calculate Huffman Code for below string values 4, 5, 7, 8, 10, 12, 20. (15)