Question Paper Code	12395

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023
Fifth Semester
Computer Science and Business Systems
20CBPC502 - DESIGN AND ANALYSIS OF ALGORITHMS
(Regulations 2020)

Duration: 3 Hours   Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

Marks, K-Level, CO

1. How to measure the algorithm running time? — *2,K1,CO1*
2. Differentiate Feasible and Optimal Solution. — *2,K2,CO1*
3. Recall Master's Theorem. — *2,K1,CO2*
4. Define recurrence relation. — *2,K1,CO2*
5. Define Brute Force Attack. — *2,K1,CO3*
6. What is state space graph? — *2,K1,CO3*
7. List two applications of graphs. — *2,K1,CO4*
8. What is the purpose of Minimum Spanning Tree? — *2,K1,CO4*
9. What is the significance of Cook's Theorem? — *2,K1,CO5*
10. Why should we use randomized algorithm? — *2,K1,CO6*

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11. a) Explain how many algorithms you can write for solving find the prime numbers. Compare which is the simplest and the most efficient. — *13,K2,CO1*

OR

   b) Explain in detail about the fundamentals of algorithmic problem solving. — *13,K2,CO1*

12. a) Explain in detail the general framework for analyzing an algorithm's efficiency. — *13,K2,CO2*

OR

   b) Explain Master Theorem for solving recurrence of the form: $T(n) = aT(n/b)+f(n)$ — *13,K2,CO2*

13. a) Solve: Find the solution for 0/1 knapsack problem using dynamic programming $(p_1,p_2,p_3, p_4) = (11, 21, 31, 33)$, $(w_1, w_2, w_3, w_4) = (2, 11, 22, 15)$, M=40, n=4. — *13,K3,CO3*

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **12395**

OR

b) Identify how backtracking techniques can be used to solve the n-queens problem with an example.   *13,K3,CO3*

14. a) Compare and contrast Tractable and non-tractable problems with suitable examples.   *13,K2,CO5*

OR

b) Summarize Reduction techniques with suitable examples in detail.   *13,K2,CO5*

15. a) Explain Travelling Salesman Problem with suitable example.   *13,K2,CO6*

OR

b) Explain in detail about Quantum Algorithm with example.   *13,K2,CO6*

PART - C (1 × 15 = 15 Marks)

16. a) Solve: For the following graph, In what order are the vertices visited using BFS and DFS starting from vertex A? Where a Choice exists, use alphabetical order.   *15,K3,CO4*
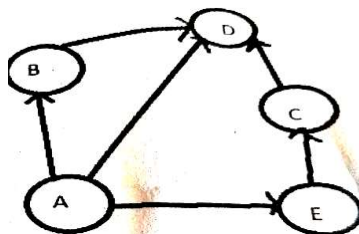
OR

b) Solve: Using minimum spanning tree find the shortest path and write algorithm for the following graph.   *15,K3,CO4*