(3 Hours) **Total Marks: 80**

N.B: (1) Question No.1 is compulsory
(2) Attempt any three questions of the remaining five questions
(3 Figures to the right indicate full marks
(4) Make suitable assumptions wherever necessary with proper justifications

Q.1 (a) Explain asymptotic notations. (5)
(b) Explain Randomized algorithms. (5)
(c) Write an Algorithm for Merge sort and derive its best case and worst case complexity. (10)

Q.2 (a) Explain Master's Theorem to find the complexity of a recurrence relation (10)
(b) Explain Naïve string matching algorithm with example. (10)

Q.3 (a) Explain Single source shortest path algorithm using Dynamic programming with suitable example. (10)
(b) Write an Algorithm for Graph Coloring problem. Also derive its complexity. (10)

Q.4 (a) Write an Algorithm for knapsack problem using Greedy method. Also derive its complexity (10)
(b) Explain the using Travelling Salesman Problem using Branch and Bound (10)

Q.5. (a) Explain Flow shop scheduling technique. (10)
(b) Write an Algorithm to find minimum cost spanning tree. Also derive its complexity. (10)

Q.6. Write Short notes on **(any two)** (20)
(a) Strassen's matrix multiplication
(b) Job- Sequencing with deadlines.
(c) Multistage Graphs

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