



Duration : 3 Hrs

Maximum Marks : 80

Note:

- 1) Question No 1 is compulsory.
- 2) Solve any three questions out of remaining five questions.

- Q.1) Solve any 4** **20**
- 1) Derive the complexity of quick sort for best case and worst case.
 - 2) What is asymptotic analysis? Define Big O, Omega and Theta notations.
 - 3) Write an algorithm to find all pairs shortest path using dynamic programming.
 - 4) Write a note on "Optimal Storage on Tapes".
 - 5) Define master theorem. Solve the following using master method.
 $T(n) = 8T(n/2) + n^2$
- Q.2.** A) Write an algorithm for finding minimum and maximum using divide and conquer. Also derive its complexity. **10**
B) Write Kruskal's algorithm and show its working by taking suitable example of graph with 5 vertices. **10**
- Q.3.** A) Solve fractional knapsack problem for the following. **10**
 $n = 6, p = (18, 5, 9, 10, 12, 7) \quad w = (7, 2, 3, 5, 3, 2)$
B) Write an algorithm for Knuth Morris Pratt (KMP) pattern matching. **10**
- Q.4.** A) Write an algorithm to solve N Queens problem. Show its working for $N = 4$. **10**
B) Write an algorithm to solve sum of subset problem and solve the following problem. $n = 4, w = \{4, 5, 8, 9\}$, required sum = 9. **10**
- Q.5.** A) Prove that Vertex Cover problem is NP Complete. **10**
B) Find the longest common subsequence for the following two strings. **10**
 $X = ABACABB \quad Y = BABCAB$
- Q.6)** Write short note on **any 2**. **20**
(a) Assembly Line Scheduling
(b) Job Sequencing with Deadlines
(c) 15 Puzzle Problem (d) P, NP and NPC Classes

Subject: Correction in \t1T00724 - S.E.(Computer Engineering)(SEM-IV)
(Choice Base) / 40502 - Analysis of Algorithms Qp Code 55801

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University of Mumbai

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Q.3.A) Missing Information is as follows

Max sack capacity $M=13$

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