S.E. (Computer) (Sem - IV) (CB)

Paper / Subject Code: 40502 / Analysis of Algorithms Date - 13/5/19

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) w=(7, 2, 3, 5, 3, 2) Max Sack Capacity M=B

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 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

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