

Roll No.

24362

B. Tech 6th Semester (CSE)

Examination – May, 2018

ANALYSIS AND DESIGN OF ALGORITHMS

Paper : CSE-306-F

Time : Three Hours] [Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is *compulsory*. Attempt *five* questions with at least *one* question from each Section.

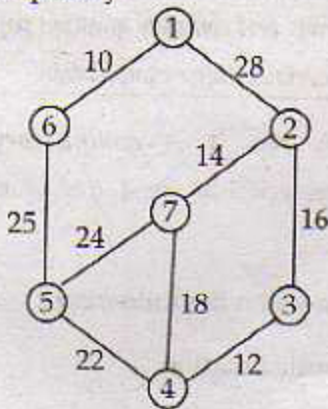
1. Write short note on the following : 4 × 5 = 20
- (a) Asymptotic notation
 - (b) Greedy Techniques
 - (c) Dominance rule
 - (d) P & NP Class

SECTION - A

2. (a) What are sets and disjoint sets. Also write Union and find algorithm for disjoint sets. 10
- (b) Explain time & space complexity. 10
3. (a) Explain Quick sort algorithm in detail. Analyse its complexity also. 10
- (b) State Strassen's matrix multiplication. How to solve this problem with Dynamic programming? 10

SECTION - B

4. Explain the concept of minimum spanning trees. Solve the following graph using prime's algorithm. Also analyse its complexity. 20



5. Explain Optimal Binary search tree which includes following problem : $n = 4$ and $(a_1, a_2, a_3, a_4) = (\text{do}, \text{if}, \text{int}, \text{while})$ with profits $P(1 : 4) = (3, 3, 1, 1)$ in case of successful search & loss $q(0 : 4) = (2, 3, 1, 1, 1)$ in case of unsuccessful search. Initially $[W(i, i) = q(i)]$.

$c(i, i) = 0$ and $r(i, i) = 0$ where $0 < i \leq 4$. Also write its algorithm and analyse its complexity. 20

SECTION - C

6. Explain 8-queens method, graph coloring and Hamiltonian cycle with example. Analyse their complexity also. 20
7. Solve the following problem by using least cost Branch & Bound method :

Knapsack instance $n = 4$, $p(1 : 4) = (10, 10, 12, 18)$ and weight $w(1 : 4) = (2, 4, 6, 9)$ & max. capacity $m = 15$. 20

SECTION - D

8. Write short note on : $4 \times 5 = 20$
- (a) Polynomial time & non-polynomial time algorithm
 - (b) Satisfiability
 - (c) Clique decision problem
 - (d) Reducibility.

9. (a) State & Prove Cook's theorem. 10
- (b) Show that Job sequencing with deadline is NP hard problem. 10
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