

**B.Tech 6th Semester (CSE) F-Scheme Examination,  
May-2017**

**ANALYSIS AND DESIGN OF ALGORITHMS**

**Paper-CSE-306-F**

*Time allowed : 3 hours]*

*[Maximum marks : 100*

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

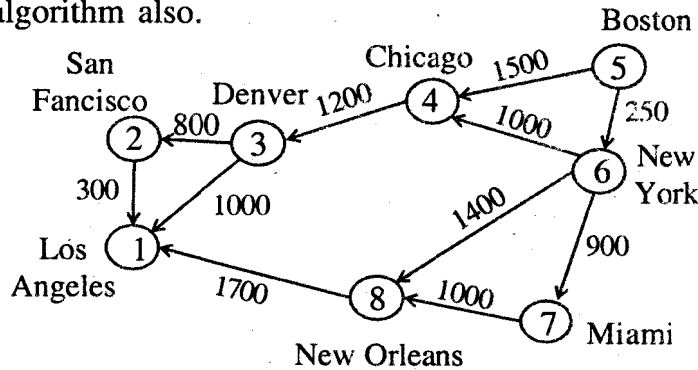
1. (a) Explain Asymptotic notation in detail.
- (b) Differentiate between greedy and dynamic techniques.
- (c) Derive relationship between P and NP.
- (d) What is dominance rule ? Explain with example. 5×4=20

**Section-A**

2. (a) Explain time & space complexity in detail. 10
- (b) Write quick sort algorithm with example and its complexity's analysis. 10
3. (a) What are graphs ? Write about different graph representations with proper diagrams. 10
- (b) State and analyse Strassen's matrix multiplication algorithm. 10

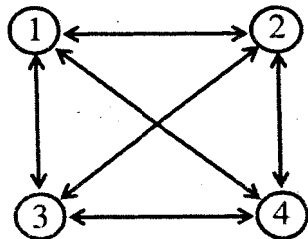
Section-B

- 4. Explain the following single source shortest path problem where source is node 5 and destination is node 1 using Greedy method. Write and analyse its algorithm also.



20

- 5. (a) Consider the 0/1 Knapsack instance where the no. of items are  $n=3$ , max capacity  $m=6$  and  $(w_1, w_2, w_3) = (2, 3, 4)$  respective  $(P_1, P_2, P_3) = (1, 2, 5)$ . Find the optimal solution using dynamic programming. 10
- (b) Solve the following dynamic programming problem : 10



0	10	15	20
5	0	9	10
6	13	0	12
8	8	9	0

Section-C

- 6. (a) Explain Backtracking. Write also for 8-queens problem with its complexity. 10
- (b) Write short note on Graph coloring and Hamiltonian cycle. Tell another method by which these problems can be solved. 10
- 7. (a) Explain lower bounds on parallel computations. 10
- (b) Solve the following problem by using LC branch and bound method :  
Knapsack instance  $n=4$ ,  $p(1:4)=(10,10,12,18)$  & weight  $w(1:4) = (2,4,6,9)$  & max. capacity  $m=15$ . 10

Section-D

- 8. Write short note on :
  - (a) Show CDP is NP complete
  - (b)  $P \subseteq NP$
  - (c) Node cover problem in NP-complete.
  - (d) Prove DHC is NP hard.  $5 \times 4 = 20$
- 9. (a) What are non-deterministic algorithm and write one for the maximum clique problem. 10
- (b) State & explain Cook's theorem. 10