

Total No. of Questions :10]

SEAT No. :

P3544

[5560]-196

[Total No. of Pages : 2

**T.E. (Information Technology)**  
**DESIGN AND ANALYSIS OF ALGORITHMS**  
**(2012 Pattern) (Semester -II) (314449)**

Time : 2½ Hours]

[Max. Marks : 70

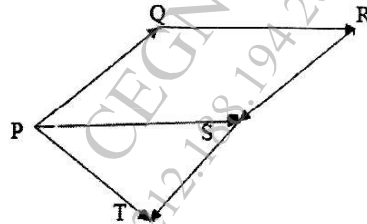
Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume suitable data, if necessary.

- Q1)** a) Construct a recurrence relation for the larger integer multiplication using divide and conquer strategy. Solve the same to analyze its time complexity. [5]  
b) Write an algorithm for quicksort using divide and conquer. [5]

OR

- Q2)** a) Compare Greedy strategy and dynamic programming. [3]  
b) Find the transitive closure of given graph. [7]



- Q3)** a) Solve the following instance of fractional knapsack and calculate maximum profit:  $n=4$ ,  $p(1:4)=\{21,12,10,8\}$ ,  $w(1:4)=\{7,3,2,4\}$ ,  $m=13$  [5]  
b) Write and explain the control abstraction for divide and conquer strategy [5]

OR

- Q4)** a) Define the principle of Optimality and describe its significance in dynamic programming. [4]  
b) Find the cost of minimum spanning tree of the given graph by using Prim's algorithm. [6]

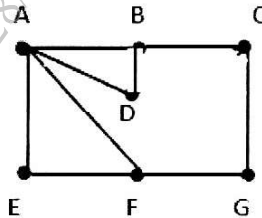
Edge	Cost	Edge	Cost	Edge	Cost	Edge	Cost
(a,b)	15	(b,c)	13	(c,d)	12	(c,e)	8
(a,c)	18	(b,d)	9	(d,e)	11	(a,e)	14

P.T.O.

- Q5) a)** Explain the following terms with suitable examples: [9]  
 i) Chromatic number of a graph  
 ii) Implicit Constraints  
 iii) Explicit Constraints  
**b)** Solve the 4-Queen's problem. Draw the state space tree for the same. [7]

OR

- Q6) a)** Find Hamiltonian cycles starting from A in given graph. Draw state space tree for the same. [8]



- b)** Write and explain backtracking algorithm for solving Sum of subsets problem. [8]
- Q7)** Describe the Travelling Salesperson Problem. Solve the following instance of TSP by dynamic programming and by LC-branch and bound. [18]

$\infty$	15	6	20
5	$\infty$	9	15
6	13	$\infty$	12
8	8	19	$\infty$

OR

- Q8)** Write short notes on : [18]  
 a) LC Search  
 b) Bounding Function  
 c) Backtracking V/s Branch and Bound

- Q9) a)** Describe working of PRAM and its various types. [8]  
**b)** Write a non-deterministic algorithm for searching of an element in an array. What is its time complexity? [8]

OR

- Q10)** Explain the following concepts with examples: [16]  
 a) Deterministic and Non-deterministic Algorithms  
 b) Decision and optimization problems  
 c) Pointer Doubling Problem.  
 d) Vertex Cover Problem

