Total No. of Questions : 10]

SEAT No. :

P3321

[Total No. of Pages : 3

[5353]-196

T.E. (Information Technology)

DESIGN AND ANALYSIS OF ALGORITHMS

(2012 Pattern)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7or Q8, Q9 or Q10.***
2) ***Neat diagram must be drawn whenever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume Suitable data if necessary.***

Q1) a) Explain direct proof & proof by counter example techniques. **[4]**

b) Define following asymptotic notations : **[6]**

i) Theta

ii) Little oh

iii) Little Omega

OR

Q2) a) Setup a recurrence relation to compute n! and solve it. **[5]**

b) Consider the following letters with their probability. **[5]**

Character	a	b	c	d	e
Probability	0.5	0.25	0.125	0.625	0.031

Find out Huffman coding for a, b, c, d, e.

Q3) a) Show the steps in multiplying the following two integers using efficiency integer multiplication method 2101 × 1130. **[5]**

b) Explain the following terms with reference to Greedy Technique **[5]**

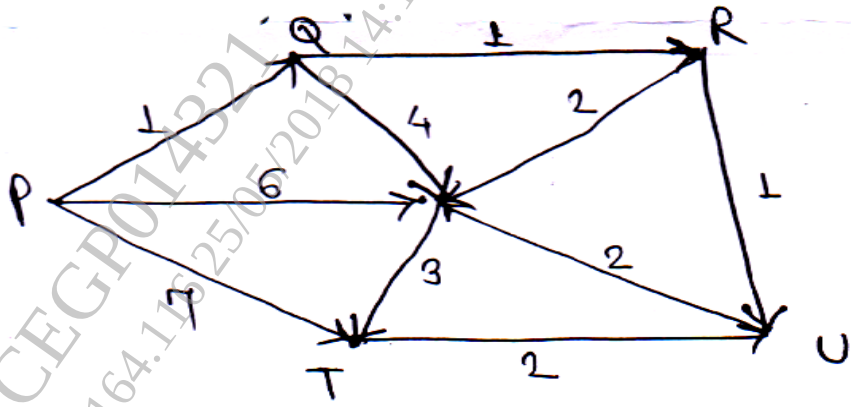
i) Feasible solution and optimal solution

ii) Subset paradigm and ordering paradigm

P.T.O.

OR

Q4) a) Apply Dijkstra's algorithm for finding all shortest paths from a single source 'p' in a given graph **[5]**



b) Explain the concept of divide and conquer technique. Write master theorem. **[5]**

Q5) a) Let w = {5, 10, 12, 13, 15, 18}, m = 30. Find all possible subsets of w that sum to m. Draw the portion of state space tree that is generated.**[8]**

b) Write a recursive backtracking algorithm for m-coloring of the graph.**[8]**

OR

Q6) a) What is m-colorability optimization problem? Explain with an example.**[8]**

b) Find all possible solutions for 5 queens' problem using backtracking method. **[8]**

Q7) What is travelling salesman problem? Find the solution of following travelling salesman problem using branch and bound method. **[18]**

∞	20	30	10	11
15	∞	16	4	2
3	5	∞	2	4
19	6	18	∞	3
16	4	7	16	∞

Cost Matrix

OR

Q8) a) What is LC Search? Explain in detail control abstraction for LC search. **[8]**

b) Solve the following instance of 0/1 knopsack problem by FIFO branch and bound approach. n = 4, M = 15 and $(P_1, P_2, P_3, P_4) = (10, 10, 12, 18)$; $(W_1, W_2, W_3, W_4) = (2, 4, 6, 9)$ **[10]**

Q9) a) What do you mean by P, NP, NP-Hard and NP-complete problems? Give an example of each category. **[8]**

b) Explain the need and significance of parallel algorithms. **[8]**

OR

Q10)a) Explain the following : **[8]**

i) Computational complexity

ii) Decision problems

iii) Deterministic and Non - determinstic classes

iv) Complexity classes

b) Explain the possible parallel computations using complete binary tree. **[8]**