Total No. of Questions : 10]

SEAT No. :

P2620

[Total No. of Pages : 3

[5153]-596

T.E. (Information Technology)

DESIGN AND ANALYSIS OF ALGORITHMS

(2012 Course) (Semester - II) (End Semester) (314449)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.*
2) *Neat diagrams must be drawn whenever necessary.*
3) *Figures to the right side indicate full marks.*
4) *Assume suitable data if necessary.*

Q1) a) Prove by method of contradiction that "There is no greatest even integer". **[5]**

b) Write an Algorithm for binary search and find the worst case efficiency. **[5]**

OR

Q2) a) Set up 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	0.0625	0.031

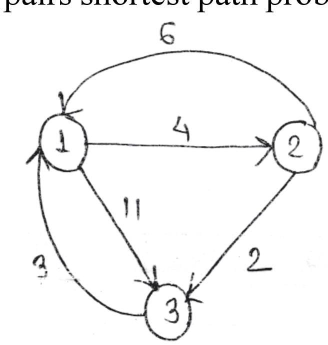
Find out Huffman coding for a, b, c, d, e.

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

b) Write Warshall's algorithm to find transitive closure. **[5]**

OR

Q4) a) Solve the all pairs shortest path problem for the given graph: **[5]**



P.T.O.

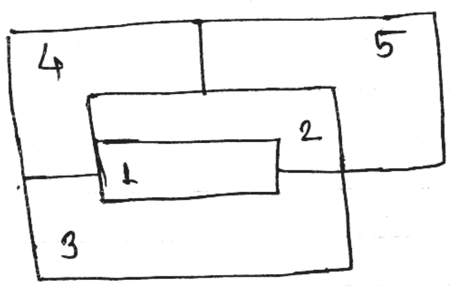
b) Explain the concept of divide and conquer technique. Write Master theorem. **[5]**

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 backing algorithm for M-coloring of the graph. **[8]**

OR

Q6) a) Construct planar graph for following map. Explain how to find M-colorings of this planar graph by using M-colorings backtracking algorithm. **[8]**



b) Write a recursive backtracking algorithm for sum of subset problem.**[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 knapsack 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) Specify one example of NP-complete problem. Also justify that why it is NP-complete. **[8]**

b) Explain pointer doubling algorithm. **[8]**

OR

Q10) a) Explain the need and significance of parallel algorithms. Define the speedup of parallel algorithm. **[8]**

b) Prove that Vertex Cover problem is NP complete. **[8]**

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