Total No. of Questions : 8]

SEAT No. : [ ]

P3630

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[5560]-586

T.E. (Computer)

DESIGN & ANALYSIS OF ALGORITHMS

(2015 Pattern) (Semester-II) (310250)

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.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn whenever necessary.***
4) ***Make suitable assumption whenever necessary.***

Q1) a) Explain issues related to iterative algorithm design. **[6]**

b) Obtain a set of optimal Huffman codes for the messages (A, B, C, D, E, F) with relative frequencies = (8, 5, 26, 30, 20, 11) draw the decode tree for this set of codes. **[6]**

c) Explain branch and bound approach with suitable example. What are general characteristics of branch and bound? **[8]**

OR

Q2) a) Consider a knapsack instance n = 4, weight (w1, w2, w3, w4) = (2, 3, 4, 5), profits (p1, p2, p3, p4) = (1, 2, 5, 6) and capacity, M = 8. Find optimal solution using dynamic programming. **[6]**

b) What is stepwise refinement? Explain with example. **[6]**

c) Why the correctness of algorithm is important. What is loop Invariant property? Explain with example. **[8]**

Q3) a) What is deterministic and non-deterministic algorithm? Explain with example. **[8]**

b) What is Boolean Satisfiability Problem? Explain 3-SAT problem. Prove 3-SAT in NP-complete. **[8]**

OR

P.T.O.

Q4) a) Define asymptotic notation. What is their significance in analyzing algorithms? Explain Big oh, Omega and Theta notations. **[8]**

b) What are steps to prove NP-completeness of a problem? Prove that vertex cover problem is NP-complete. **[8]**

Q5) a) Explain the concept of Randomized algorithm and approximation algorithm in brief with example. **[8]**

b) Explain embedded system? Explain scheduling algorithm for embedded system in detail. **[8]**

OR

Q6) a) What is amortized analysis? Explain aggregate and accounting techniques with example. **[8]**

b) Write short note on: **[8]**

i) Binary Heap ii) Splay Trees

Q7) a) Explain multithreaded algorithms. How to analyze multithreaded algorithms? What is race condition, parallel loops? **[9]**

b) Write and explain Rabin-Karp algorithm. Explain the worst case and best case running time of Rabin Karp Algorithm? **[9]**

OR

Q8) a) Give pseudo code for Multithreaded matrix multiplication. Analyze the same. **[9]**

b) What is distributed algorithm? Explain Distributed Minimum Spanning Tree. **[9]**