

Total No. of Questions : 8]

SEAT No. :

**P3630**

**[5560]-586**

[Total No. of Pages : 2

**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  $(w_1, w_2, w_3, w_4) = (2, 3, 4, 5)$ , profits  $(p_1, p_2, p_3, p_4) = (1, 2, 5, 6)$  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]

