C 62930 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE [SUPPLEMENTARY] EXAMINATION, APRIL 2014

(2009 Scheme)

CS/PTCS 09 702—DESIGN AND ANALYSIS OF ALGORITHMS

Time : Three Hours Maximum : 70 Marks

Part A

I. (a) Define recurrence relation.

(b) What is divide and conquer method of problem solving ?

(c) What is NP-hard problem ?

(d) List the properties of probabilistic algorithms.

(e) What is Hashing ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

II. (a) Explain the various asymptotic efficiency of an algorithm.

(b) Explain the insertion operation of a red-black tree.

(c) Discuss in detail about the Floyd-Warshall algorithm.

(d) With an example explain the Kruskal's algorithm of finding MST of a graph.

(e) Prove that if NP ≠ Co-NP then P ≠ NP.

(f) Discuss about the Miller Rabin Primality test.

(4 × 5 = 20 marks)

Part C

III. (a) Explain binary search algorithm and provide the complete analysis of it with an example.

Or

(b) With an example explain quick sort algorithm and the complete analysis of it.

IV. (a) Write an algorithm that multiplies two $n \times n$ matrices using $O(n^3)$ operations. Determine the precise number of multiplications, additions and array element accesses.

Or

(b) Write an algorithm to solve n-queens problem using backtracking.

Turn over

V. (a) Discuss about Subset-sum problem. Prove that Subset-sum problem is NP-complete.

Or

(b) Show that the problem of determining the satisfiability of Boolean formulas in disjunctive normal form is polynomial-time solvable.

VI. (a) Explain in detail about the Monte-Carlo algorithm and its usage.

Or

(b) Explain Dixon's integer factorization algorithm.

(4 × 10 = 40 marks)