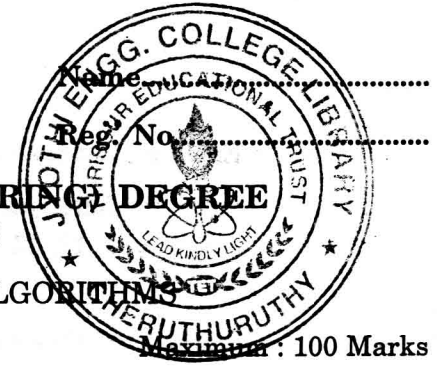**C 29018**

(Pages 2)

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2012

CS 04 704—DESIGN AND ANALYSIS OF ALGORITHMS

Time : Three Hours   Maximum : 100 Marks

Part A

Answer **all** *questions.*

1. (a) Write the Algorithm for Quick sort.

   (b) What are the criteria an algorithm should satisfy ?

   (c) Write short notes on optional polygon triangulation problem.

   (d) Describe the Floyd Warshall algorithm.

   (e) Show that the vertex cover problem is NP complete.

   (f) What is the relation between NP-hard and NP complete problems ?

   (g) Briefly explain Monte-Carlo algorithms.

   (h) Write pollard rho factoring algorithm to find the factor of n.

   $(8 \times 5 = 40 \text{ marks})$

Part B

2. (a) Derive the recurrence for Fibonacci series perform complexity analysis for the same.

   (15 marks)

   Or

   (b) (i) Define the asymptotic notations used for best case, average case, worst case analysis of algorithms.

   (8 marks)

   (ii) Write an algorithm for finding maximum element of an array perform best, worst, and average case complexity with appropriate order notations.

   (7 marks)

3. (a) (i) Give the relative merits and demerits of divide and conquer when compared to Greedy method.

   (8 marks)

   (ii) Give the time complexity of the generic divide and conquer algorithm.   (7 marks)

   Or

Turn over

(b) (i) Explain Matrix chain multiplication with an example.   (8 marks)

   (ii) Solve the following D/1 knapsack problem using dynamic programming (P = 11, 21, 31, 33), W = (2, 11, 22, 15), C = 40, N = 4.

                                                                            (7 marks)

4. (a) (i) Explain the classes of the P and NP.   (8 marks)

    (ii) Write a non-deterministic knapsacle algorithm.   (7 marks)

Or

(b) (i) Explain the method of reduction to solve the TSP problem using branch and bound.

                                                                  (7 marks)

   (ii) Define the following give suitable example for each :—

      1 Polynomial problem.

      2 Undividable problem.

                                                                       (8 marks)

5. (a) (i) Write a randomized algorithm to statistic in a set of n elements and select.   (8 marks)

    (ii) Design a turning machine that increments a binary which is stored on that input tupe.

                                                                   (7 marks)

Or

(b) State and explain Miller Robin test. Give example to illustrate the principle.

                                                        (15 marks)

                                                           [4 × 15 = 60 marks]