Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – WINTER 2013

Subject Code: 173205 **Date: 03-12-2013**

Subject Name: Design and Analysis of Algorithm / Computer Algorithm

Time: 10.30 am - 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Define Asymptotic notations. List and explain all the asymptotic notations in detail. **07**

(b) What is an Algorithm? Explain : Best case , Average Case and worst case analysis. **07**

Q.2 **(a)** Solve the following recurrence: **07**

(i) $T(n) = 8T(n/2) + O(n^2)$. (ii) The Fibonacci series is given by:

$$T(m) = \begin{cases} m & \text{, if } m = 0 \text{ or } 1 \\ T(m-1) + T(m-2) & \text{, otherwise} \end{cases}$$

(b) Define Minimum spanning tree. Write and explain Krushkal's Algorithm with example. **07**

OR

(b) Define Minimum spanning tree. Write and explain Prim's Algorithm with example. **07**

Q.3 **(a)** Write an algorithm for Fractional knapsack problem using greedy approach. Also explain it in detail with an example. **07**

(b) Explain Merge Sort algorithm with example. Also, derive it's complexity. **07**

OR

Q.3 **(a)** Write an algorithm for Making Change problem using dynamic approach. Also explain it in detail with an example. **07**

(b) Explain Quick Sort algorithm with example. Also, derive it's complexity. **07**

Q.4 **(a)** Write the equations for Longest common subsequence(LCS) using dynamic approach and find LCS for the following string: **07**

X = <A,B,B,D,C> and Y = <B,B,C>

(b) Write and Explain Rabin Karp string matching algorithm with example. **07**

OR

Q.4 **(a)** Find an optimal solution of Matrix Chain product using dynamic approach whose sequence is (4,3,5,5). **07**

(b) Write and Explain Naive string matching algorithm in detail with example. **07**

Q.5 **(a)** Explain the following terms with example : **07**

(i) NP Problems (ii) Articulation Point

(b) Explain the concept of Backtracking. Demonstrate it using 8 Queens problem. **07**

OR

Q.5 **(a)** Explain the following terms with example : **07**

(i) P Problems (iii) Bridge

(b) Explain the concept of Backtracking. Demonstrate it using Knapsack problem. **07**

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