

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**

$X = \langle A, B, B, D, C \rangle$ and $Y = \langle B, B, C \rangle$

(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**
