Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER • 2014

Subject Code: 150703 Date: 19-06-2014

Subject Name: Design and Analysis of Algorithms

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)** Why do we use asymptotic notations in the study of algorithms? Briefly describe the commonly used asymptotic notations. **07**

(b) Explain Greedy method in detail with example and differentiate it with dynamic method. **07**

Q.2 **(a)** Sort the letters of word "DESIGN" in alphabetical order using bubble sort. **07**

(b) Write algorithm to find Minimum Spanning Tree (MST) using Prim's method and compute its time complexity. **07**

OR

(b) Define MST. Explain Kruskal's algorithm with example for construction of MST. **07**

Q.3 **(a)** Sort the following list using quick sort algorithm: **<50, 40, 20, 60, 80, 100, 45, 70, 105, 30, 90, 75>** Also discuss worst and best case of quick sort algorithm. **07**

(b) Given two sequences of characters, P=<ABCDABE>, Q=<CABE > Obtain the longest common subsequence. **07**

OR

Q.3 **(a)** Given the four matrix find out optimal sequence for multiplication D=<15,5,10,20,25> **07**

(b) Given coins of denominations 1,3 and 4 with amount to be pay is 7. Find optimal no. of coins and sequence of coins used to pay given amount using dynamic method. **07**

Q.4 **(a)** Write a brief note on NP-completeness and the classes-P, NP and NPC. **07**

(b) Explain the heap sort in detail. Give its complexity. **07**

OR

Q.4 **(a)** Explain Backtracking Method. What is N-Queens Problem? Give solution of 4-Queens Problem using Backtracking Method. **07**

(b) Explain finite automata algorithm for string matching. **07**

Q.5 **(a)** Solve following knapsack problem using dynamic programming algorithm with given capacity W=5, Weight and Value are as follows : (2,12),(1,10),(3,20),(2,15) **07**

(b) Explain Rabin-Karp Algorithm for string matching and give it complexity. **07**

OR

Q.5 **(a)** Explain Selection Sort Algorithm and give its best case, worst case and average case complexity. **07**

(b) Show how divide and conquer technique is used to compute product of two n digit no with example. **07**

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