

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**
