

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– V • EXAMINATION – WINTER 2016

Subject Code: 150703

Date: 19/11/2016

Subject Name: Design and Analysis of Algorithms

Time: 10:30AM – 01:00PM

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) Explain all asymptotic notations used in algorithm analysis. **07**
- (b) What is Recursion? Give Recursive algorithm for Tower of Hanoi Problem and give analysis of it. **07**
- Q.2** (a) Explain Greedy method in detail with example and differentiate it with dynamic method. **07**
- (b) Differentiate BFS and DFS. **07**
- OR**
- (b) What is an amortized analysis? Explain accounting method and aggregate analysis with suitable example. **07**
- Q.3** (a) Explain Prim's algorithm with example for construction of MST. **07**
- (b) Explain Rabin-Karp Algorithm for string matching and give it complexity. **07**
- OR**
- Q.3** (a) Explain Kruskal's algorithm with example for construction of MST. **07**
- (b) Given the four matrix find out optimal sequence for multiplication $D = \langle 15, 5, 10, 20, 25 \rangle$ **07**
- Q.4** (a) Discuss and derive an equation for solving the 0/1 Knapsack problem using dynamic programming method. Design and analyze the algorithm for the same. **07**
- (b) 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**
- OR**
- Q.4** (a) Explain the use of Divide and Conquer Technique for Binary Search Method. What is the complexity of Binary Search Method? **07**
- (b) Explain in Brief: Travelling Salesman Problem, Recurrence Equations, Relation, Approximation Algorithms. **07**
- Q.5** (a) Explain Strasson's algorithm for matrix multiplication. **07**
- (b) What is a finite automaton? Discuss how a finite automaton is used for string matching? **07**
- OR**
- Q.5** (a) Explain Backtracking Method. What is N-Queens Problem? Give solution of 4-Queens Problem using Backtracking Method. **07**
- (b) Write a brief note on NP-completeness and the classes-P, NP and NPC. **07**
