

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-V • EXAMINATION – WINTER • 2014

Subject Code: 150703

Date: 03-12-2014

Subject Name: Design and Analysis of Algorithms

Time: 10.30 am - 01.00 pm

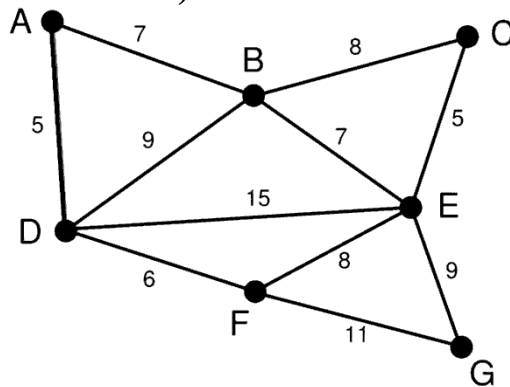
Total Marks: 70

Instructions:

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

- Q.1 (a)** Explain Bubble sort algorithm. Derive the algorithmic complexity in Best case, worst case and Average case analysis. **07**
- (b)** Explain master theorem and solve the following recurrence equation with master method **07**
1. $T(n) = 9T(n/3) + n$
 2. $T(n) = 3T(n/4) + \lg n$

- Q.2 (a)** Explain Binary search algorithm with divide and conquer strategy and use the recurrence tree to show that the solution to the binary search recurrence $T(n) = T(n/2) + \Theta(1)$ is $T(n) = \Theta(\lg n)$. **07**
- (b)** Find Minimum Spanning Tree for the given graph using Prim's Algo. (initialization from node A) **07**



OR

- (b)** What is an amortized analysis? Explain accounting method and aggregate analysis with suitable example. **07**

- Q.3 (a)** Given two sequences of characters, $P = \langle XYZYTX \rangle$ $Q = \langle YTZX \rangle$ Obtain the longest common subsequence. **07**
- (b)** What is Finite Automata? Explain use of finite automata for string matching with suitable example. **07**

OR

- Q.3 (a)** Describe an assembly line scheduling problem and give dynamic programming algorithm to solve it. **07**
- (b)** Is Selection sorting a greedy algorithm? If so, what are the functions involved. **07**

- Q.4 (a)** How you can identify articulation points explain with example. Describe the use of articulation point. **07**
- (b)** Explain in Brief:
NP Hard Problem, Polynomial reduction. **07**
- OR**
- Q.4 (a)** Explain Backtracking with Knapsack problem. **07**
- (b)** Explain Dijkstra's shortest path algorithm with example. If we want to display intermediate node than what change we should make in the algorithm **07**
- Q.5 (a)** Explain Rabin-Karp method for string matching and also give the algorithm. **07**
- (b)** Explain Strasson's algorithm for matrix multiplication. **07**
- OR**
- Q.5 (a)** Explain how to apply the divide and conquer strategy for sorting the elements using quick sort with example. Write algorithm for quick sort method. **07**
- (b)** Using algorithm find an optimal parenthesization of a matrix chain product whose sequence of dimension is (13,5,89,3,34)(use dynamic programming). **07**
