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.**

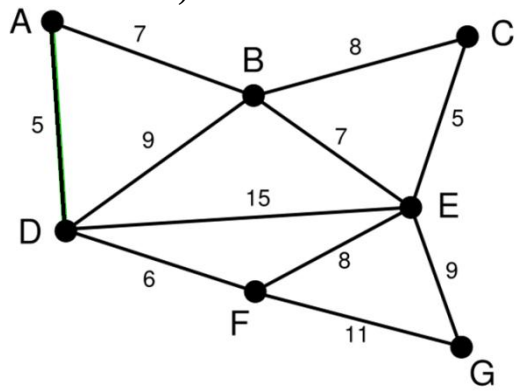
Q.1 **(a)** Explain Bubble sort algorithm. Derive the algorithmic complexity in Best case, worst case and Average case analysis. **07**

(b) Explain master theorm and solve the following recurrence equation with master method **07**

1. T(n)= 9T(n/3) + n
2. T(n)= 3T(n/4) + nlgn

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) + Θ(1) is T(n) = Θ(lgn). **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=<XYZYTXY> Q=<YTZXYX> 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**

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