Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER I (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2710201 **Date:17/05/2016**

Subject Name: Computer Algorithm

Time:02:30 pm to 05:00 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)** Trace the word U,N,I,V,E,R,S,I,T,Y using insertion sort. Find time complexity of insertion sort algorithm in best case. **07**

(b) Explain various asymptotic methods used to represent the rate of growth of running time of algorithms. **07**

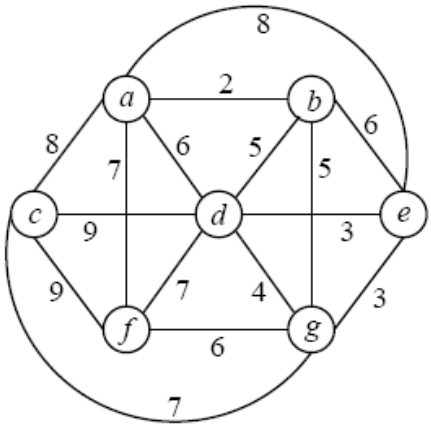
Q.2 **(a)** Why worst case analysis of algorithms is most important than average case analysis? **07**

(b) The running time of a divide-and-conquer algorithm satisfies the recurrence T(n) = 5T(n/2)+(n^2). What is T(n) in the big-Theta notation of a function of n? Using any recurrence method. **07**

OR

(b) Explain principle of optimality and discuss making change problem by using it. **07**

Q.3 **(a)** In the following figure, a weighted undirected graph is shown. Construct a minimum spanning tree (MST) of this graph using Kruskal's algorithm. Draw the MST of the graph. Also write in the sequence of edges chosen by Kruskal's algorithm. **07**



(b) Explain Huffman code algorithm with greedy approach. **07**

OR

Q.3 **(a)** What is a minimum spanning tree? Mention the applications and explain any single application with examples. **07**

(b) Discuss Dijkstra algorithm with example. **07**

Q.4 **(a)** Explain the example of NP Complete problem in detail. **07**

(b) Explain Boyer Moore Pattern string matching algorithm in detail. **07**

OR

Q.4 **(a)** Explain potential method and accounting method in amortized analysis. **07**

	(b)	Explain Rabin Karp string matching algorithm in detail.	**07**
Q.5	**(a)**	Explain Floyd algorithm. Does Floyd algorithm work on a graph that has some edge whose lengths are negative but that does not include a negative cycle? Justify your answer.	**07**
	(b)	Show how knapsack problem is np complete. Give Fully Polynomial-time approximation scheme for knapsack problem.	**07**

OR

Q.5	**(a)**	Why travelling salesman problem is NP complete? Which heuristic is used to solve it?	**07**
	(b)	Prove that fractional knapsack problem has greedy choice property. Can fractional knapsack problem solved by dynamic programming justify your answer with example.	**07**

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