Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2150703 **Date: 05/05/2017**

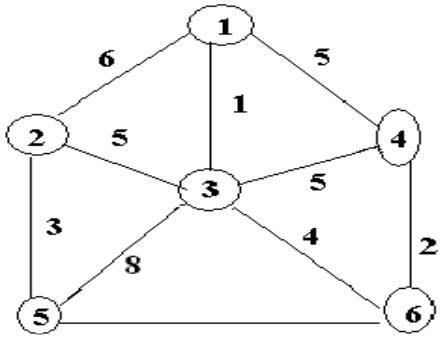
Subject Name: Analysis and Design of Algorithms

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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	What is an algorithm?	
	2	What is worst case time complexity ?	
	3	Define space complexity.	
	4	Define Big Omega Asymptotic Notation.	
	5	Define Feasible Solution.	
	6	What is vector? Which operations are performed on vector?	
	7	Define P-type Problem.	
	8	Write Principal of Optimality.	
	9	Define Directed Acyclic Graph.	
	10	List types of algorithms.	
	11	Write down the Best case, Worst Case and Average case Complexity for merge sort.	
	12	Define Minimum Spanning Tree.	
	13	Write down the Best case, Worst Case and Average case Complexity for selection sort.	
	14	Write down the Best case, Worst Case and Average case Complexity for Heap sort.	
Q.2	**(a)**	Explain the difference between Greedy and Dynamic Algorithm.	**03**
	(b)	Apply the bubble sort algorithm for sorting {U,N,I,V,E,R,S}	**04**
	(c)	Analyze Selection sort algorithm in best case and worst case.	**07**
		OR	
	(c)	Analyze Quick sort algorithm in best case and worst case.	**07**
Q.3	**(a)**	Write down the characteristics of Greedy Algorithm.	**03**
	(b)	Solve following recurrence using master method $T(n) = 9T(n/3) + n$	**04**
	(c)	Solve Making change problem using dynamic technique. D1 = 1, d2=3, d3=5, d4=6. Calculate for making change of Rs. 8.	**07**
		OR	
Q.3	**(a)**	Solve following recurrence using master method $T(n) = T(2n/3) + 1$	**03**

(b) 

04

4 Compute MST using PRIM's Algorithm.

(c) Given two sequence of characters, X={G,U,J,A,R,A,T}, Y = {J,R,A,T} obtain the longest common subsequence. **07**

Q.4 **(a)** Multiply 981 by 1234 by divide and conquer method. **03**

(b) Find an optimal Huffman code for the following set of frequency. a : 50, b: 20, c: 15, d: 30. **04**

(c) Consider Kanpsack capacity W=50, w=(10,20,40) and v=(60,80,100) find the maximum profit using greedy approach. **07**

OR

Q.4 **(a)** Expalin Dijkstra algorithm to find the shortest path. **03**

(b) Explain in brief Breadth First Search method. **04**

(c) For the following chain of matrices find the order of parenthesization for the optimal chain multiplication (15,5,10,20,25) **07**

Q.5 **(a)** Explain: Articulation Point, Graph, Tree **03**

(b) Explain 4 queen problem with one of the solution, **04**

(c) What is Rabin Karp algorithm? Where it is used? Explain the concept behind this algorithm and calculate its time complexity. **07**

OR

Q.5 **(a)** What is Finite Automata? Explain use of finite automata for string matching with suitable example. **03**

(b) Explain naïve string matching algorithm with example. **04**

(c) Explain Traveling salesman problem with example. **07**

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