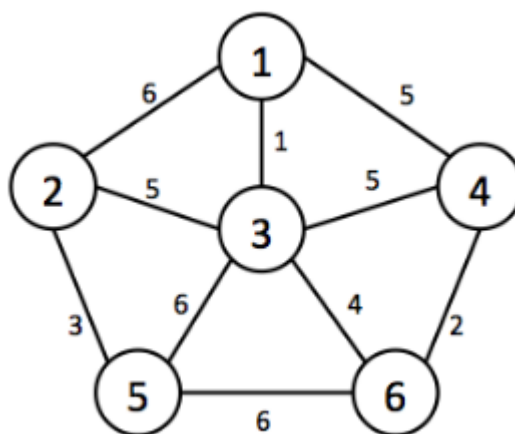


**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER- V(OLD) EXAMINATION – SUMMER 2019****Subject Code:150703****Date:31/05/2019****Subject Name:Design And Analysis Of Algorithms****Time:02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

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

- Q.1** (a) Define Algorithm. Discuss factors affecting time complexity of an algorithm. **07**  
(b) Explain Big Oh (O), Omega ( $\Omega$ ) and Theta ( $\theta$ ) asymptotic notations. **07**
- Q.2** (a) Apply merge sort algorithm on array  $A = \{2,7,3,5,1,9,4,8\}$ . What is time complexity of merge sort in worst case? **07**  
(b) Define Minimum Spanning Tree. Use Krushkal's algorithm to find Minimum Spanning Tree of given graph **07**

**OR**

- (b) Discuss any two methods of amortized analysis in detail **07**
- Q.3** (a) Write greedy algorithm for job scheduling problem. Derive its time complexity. **07**  
(b) Write divide and conquer algorithm to solve Exponential problem. Also solve  $2^9$  using same algorithm. **07**

**OR**

- Q.3** (a) Obtain longest common subsequence using dynamic programming. Given  $A = \text{"acabaca"}$  and  $B = \text{"bacac"}$  **07**  
(b) Explain Depth First Search algorithm for a graph with example. Also explain Tree Edges, Back Edges and Cross Edges **07**
- Q.4** (a) Solve making change problem using dynamic programming Given amount  $N=8$ , and denominations  $d = \{1, 3, 5, 6\}$  **07**  
(b) What is backtracking? How 4-Queen problem is solved using backtracking? **07**

**OR**

- Q.4** (a) Sort given array  $A = \{27, 46, 11, 95, 67, 32, 78\}$  using insertion sort algorithm. Also perform best case and worst case analysis of insertion sort algorithm. **07**  
(b) How Rabin Karp algorithm performs string matching? Explain with example. **07**
- Q.5** (a) Explain P Problem, NP Problem and NP Complete Problem. **07**  
(b) Write Naïve sting matching algorithm. Find its time complexity and perform sting matching for given pattern  $P = \text{"ACD"}$  Text  $T = \text{"CACDACAACDAC"}$  **07**

- Q.5** (a) Explain in brief: Articulation Point, Directed Acyclic Graph, Recurrence Relations **07**
- (b) Explain how to solve knapsack problem using greedy algorithms **07**

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