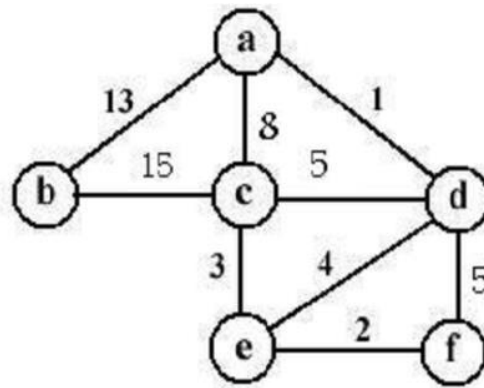


**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-V(NEW) EXAMINATION – SUMMER 2022****Subject Code:3150703****Date:07/06/2022****Subject Name:Analysis and Design of Algorithms****Time:02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

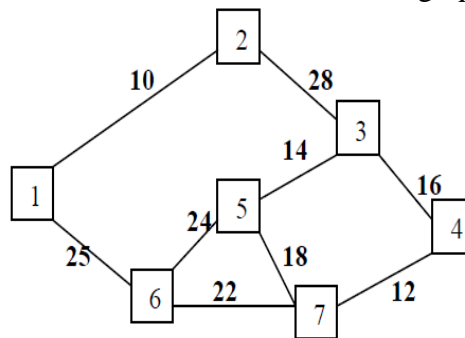
		Marks
<b>Q.1</b>	(a) Define Algorithm, Time Complexity and Space Complexity	<b>03</b>
	(b) Explain: Worst Case, Best Case and Average Case Complexity with suitable example.	<b>04</b>
	(c) Sort the following list using quick sort algorithm: < 5, 3, 8, 1, 4, 6, 2, 7 > Also write Worst and Best case and Average case of quick sort algorithm.	<b>07</b>
<b>Q.2</b>	(a) Write an algorithm of Selection Sort Method.	<b>03</b>
	(b) Demonstrate Binary Search method to search Key = 14, form the array A=<2,4,7,8,10,13,14,60>	<b>04</b>
	(c) Write the Master theorem. Solve following recurrence using it. (i) $T(n) = T(n/2) + 1$ (ii) $T(n) = 2T(n/2) + n \log n$	<b>07</b>
	<b>OR</b>	
	(c) Solve following recurrence relation using iterative method $T(n) = T(n - 1) + 1$ with $T(0) = 0$ as initial condition. Also find big oh notation	<b>07</b>
<b>Q.3</b>	(a) What is Principle of Optimality? Explain its use in Dynamic Programming Method	<b>03</b>
	(b) Find out LCS of A={K,A,N,D,L,A,P} and B = {A,N,D,L}	<b>04</b>
	(c) Discuss Assembly Line Scheduling problem using dynamic programming with example.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Give the characteristics of Greedy Algorithms	<b>03</b>
	(b) Give difference between greedy approach and dynamic programming.	<b>04</b>
	(c) Consider Knapsack capacity $W=15$ , $w = (4, 5, 6, 3)$ and $v=(10, 15, 12, 8)$ find the maximum profit using greedy method.	<b>07</b>
<b>Q.4</b>	(a) Explain: Articulation Point, Graph, Tree	<b>03</b>
	(b) Find Minimum Spanning Tree for the given graph using Prim's Algorithm.	<b>04</b>



- (c) Explain Breath First Traversal Method for Graph with algorithm with example. **07**

**OR**

- Q.4** (a) Explain Huffman code with Example. **03**  
 (b) Write the Kruskal's Algorithm to find out Minimum Spanning Tree. Apply the same and find MST for the graph given below **04**



- (c) Explain fractional knapsack problem with example. **07**

- Q.5** (a) What is string-matching problem? Define valid shift and invalid shift. **03**  
 (b) Define P, NP, NP-Hard and NP-Complete Problem **04**  
 (c) Explain Backtracking Method. What is N-Queens Problem? Give solution of 4- Queens Problem using Backtracking Method. **07**

**OR**

- Q.5** (a) Explain "P = NP ?" problem. **03**  
 (b) Explain Minimax principal. **04**  
 (c) What is Finite Automata? Explain use of finite automata for string matching with suitable example. **07**