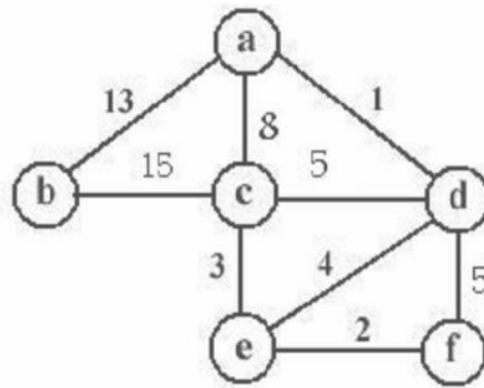


GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V(NEW) EXAMINATION – SUMMER 2022****Subject Code:3150703****Date:07/06/2022****Subject Name:Analysis and Design of Algorithms****Time:02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

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.

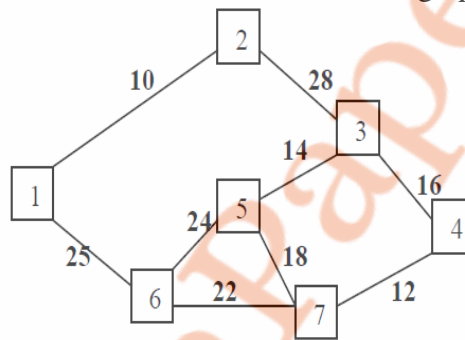
		Marks
Q.1	(a) Define Algorithm, Time Complexity and Space Complexity	03
	(b) Explain: Worst Case, Best Case and Average Case Complexity with suitable example.	04
	(c) Sort the following list using quick sort algorithm: < 5, 3, 8, 1, 4, 6, 2, 7 > Also write Worst and Best case and Average case of quick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



- (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