

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2018

**Subject Code:2150703**

**Date:27/11/2018**

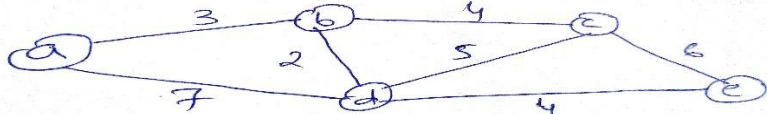
**Subject Name:Analysis and Design of Algorithms**

**Time: 10:30 AM TO 01:00 PM**

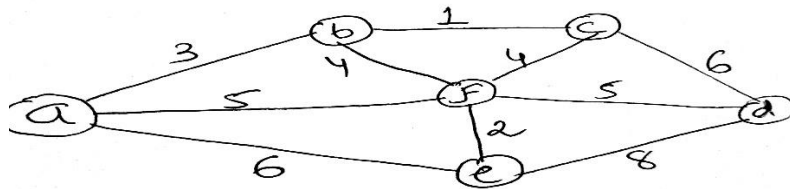
**Total Marks: 70**

**Instructions:**

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

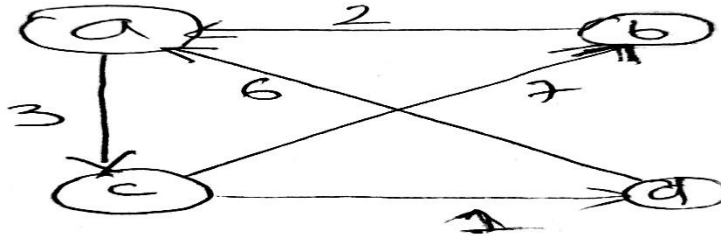
		MARKS
<b>Q.1</b>	(a) Define Algorithm, Time Complexity and Space Complexity.	<b>03</b>
	(b) Differentiate branch and bound and back tracking algorithm.	<b>04</b>
	(c) Analyze Selection sort algorithm in best case and worst case.	<b>07</b>
<b>Q.2</b>	(a) Solve the recurrence $T(n) = 7T(n/2) + n^3$	<b>03</b>
	(b) Explain: Articulation Point, Graph, Tree	<b>04</b>
	(c) Write Merge sort algorithm and compute its worst case and best-case time complexity. Sort the List G,U,J,A,R,A,T in alphabetical order using merge sort.	<b>07</b>
	<b>OR</b>	
	(c) Consider Knapsack capacity $W=9$ , $w = (3,4,5,7)$ and $v=(12,40,25,42)$ find the maximum profit using dynamic method.	<b>07</b>
<b>Q.3</b>	(a) Differentiate the Greedy And Dynamic Algorithm.	<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) Solve Making change problem using dynamic technique. $d1 = 1$ , $d2=2$ , $d3=4$ , $d4=6$ , Calculate for making change of Rs. 10.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Find out the NCR $\binom{5}{3}$ Using Dynamic Method.	<b>03</b>
	(b) Find single source shortest path using Dijkstra's algorithm form a to e.	<b>04</b>
		
	(c) For the following chain of matrices find the order of parenthesization for the optimal chain multiplication (13,5,89,3,34).	<b>07</b>
<b>Q.4</b>	(a) Explain Tower of Hanoi Problem, Derive its recursion equation and computer it's time complexity.	<b>03</b>
	(b) Explain finite automata algorithm for string matching.	<b>04</b>
	(c) Find out LCS of $A=\{K,A,N,D,L,A,P\}$ and $B = \{A,N,D,L\}$	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Explain Principle of Optimality with example.	<b>03</b>
	(b) Define BFS. How it is differ from DFS.	<b>04</b>
	(c) Solve the following instance of knapsack problem using Backtracking Technique. The Capacity of the Knapsack $W = 8$ and $w = (2,3,4,5)$ and value $v = (3,5,6,10)$	<b>07</b>
<b>Q.5</b>	(a) Draw the state space tree Diagram for 4 Queen problem.	<b>03</b>
	(b) Define P, NP, NP-Hard and NP-Complete Problem.	<b>04</b>

- (c) Find out the Minimum Spanning Tree using Kruskal Algorithm for given Graph. 07



OR

- Q.5 (a) Explain naïve string matching algorithm with example. 03  
 (b) Explain DFS algorithm in brief. 04  
 (c) Find all pair of shortest path using Floyd's Algorithm for given graph 07



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