Sardar Patel Institute of Technology
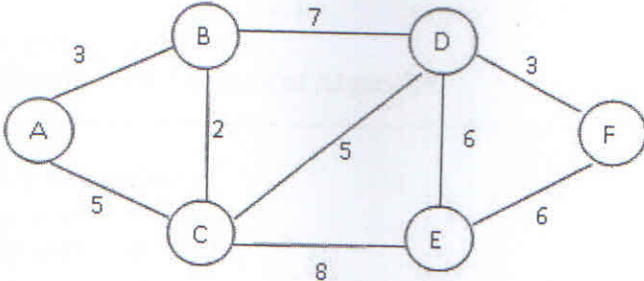
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

RE-Examination
Jan 2019

Max. Marks: 100
Class: S.E.
Course Code: IT41 / CE41
Name of the Course: Design And Analysis of Algorithm

Duration: 3 Hrs
Semester: IV
Branch: IT/COMP

Instructions:
 (1) All Questions are Compulsory
 (2) Draw neat diagrams
 (3) Assume suitable data if necessary

Question No.	Question	Max. Mks	CO
Q. 1 a)	Write a short note on Asymptotic Notations.	05	CO1
Q. 1 b)	Write an Insertion Sort algorithm and analyze the Best Case and Worst Case time complexity.	05	CO1
Q. 1 c)	Derive the best and worst case time complexity of Quick Sort algorithm and Sort the following elements using Quick Sort Algorithm. Show the steps of each passes. 85, 36, 87, 10, 91, 18, 15, 52 **OR** Write an algorithm using Divide and conquer approach for finding minimum and maximum number form a given set. Simulate the above algorithm to find Min and Max on the following elements. Show the tree of recursive calls 22 13 -5 -8 15 60 17 31 47	10	CO2
Q. 2 a)	Using Dynamic Programming approach 0/1 Knapsack, Find the optimal solution to the below given knapsack instance where n=5 and capacity of the knapsack=10	10	CO3

Item No.	1	2	3	4	5
Weight	1	2	4	2	5
Value	5	3	5	3	2

Q2. b)	Write Kruskal's algorithm and for the following graph find minimum spanning tree using Kruskal's Algorithm.		*10*	**CO4**
Q.3 a)	Explain LCS using Dynamic Programming Approach. Find LCS using Dynamic Programming Approach of the following two strings: Y="ABBCCDB" X="ABCDBCA"		*10*	**CO5**
Q.3 b)	Compare Backtracking and Branch and Bound. Explain Graph coloring problem using Backtracking Approach with the help of State Space Tree. **OR** Explain how Traveling Salesperson problem can be solved using Branch and Bound with the help of State Space Tree.		*10*	**CO5**
Q.4 a)	Write a backtracking algorithm for sum of subset problem. Draw portion of state space tree that is generated to find all possible subsets of w that sum to m using above algorithm for the given problem: n=7, w= {5, 7, 10, 12, 15, 18, 20}, m=35		*10*	**CO5**
Q4 b)	Write a KMP-Prefix Function algorithm and Compute the prefix function for the given pattern i) cocacola ii) bababba **OR** Consider working module q=11, how many spurious hits does the Rabin-Karp Matcher counter in the text T= 31415926535 when looking for the pattern P = 26. Show each step of solution.		*10*	**CO5**

Q.5a)	Make use of greedy approach to find the shortest distance from node A to F where node A is a source node	10	CO4
Q.5. b)	Solve the following linear program using SIMPLEX: maximize $z=12x_1 + 16x_2$ subject to $\quad 10x_1+ 20x_2 \le 120$ $\quad 8x_1+ 8x_2 \le 80$ $\quad x_1$ and $x_2 \ge 0$ **OR** Explain how to convert Linear Problem into the following form; i) Standard and Slack form ii) Dual Form. Show above mentioned conversion (i and ii) with an example.	10	CO6