3-5-16 (M)

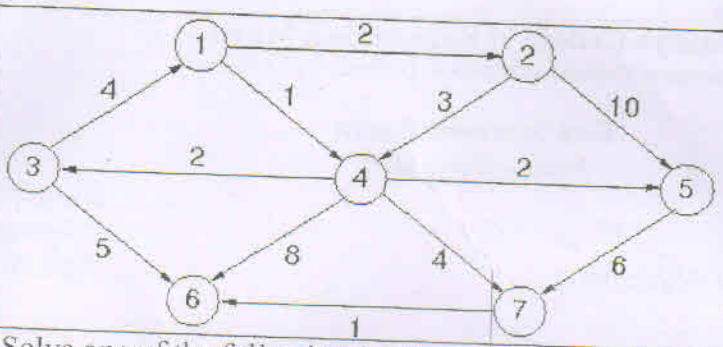
K. J. Somaiya College of Engineering, Mumbai-77
(Autonomous College Affiliated to University of Mumbai)

End Semester Exam
April - May 2016

Max. Marks:100 **Duration: 3hrs**
Class SY B. Tech Semester: IV
Name of the Course: Analysis of Algorithms Branch: COMP
Course Code: UCEC403

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

Question No.		Max. Marks
Q 1 (a)	Define asymptotic notations. Explain the time complexity and space complexity in detail with examples.	10
Q 1 (b)	i) Solve the recurrence relation T(n)=2T(N/2)+ N using recurrence tree method ii) Derive worst case and best case complexity for Binary Search sort.	10
Q2 (a)	i) Apply Merge sort and Quick sort sorting technique to the given input and show output after each pass for both the algorithms. ii) Also state complexity for both the algorithm Input:- 66, 87,21, 57, 3, 71, 22, 99, 10, 88 **OR** i) Explain MaxMin as divide and conquer method. ii) For the given input, Draw the divide and conquer tree diagram to find minimum and maximum of the given Input :- 44,11,56,1,38,10,19,40,78 iii) Also compute complexity of the algorithm	10
Q2 (b)	Explain the concept of Job sequencing with deadlines with an example. Compute all feasible solutions and prove how the greedy strategy gives optimal solution for the problem.	10
Q3 (a)	Solve the given instance of problem to compute Single source shortest path from **first vertex in sequence** to the rest of vertices using greedy Programming. (Source vertex =1)	10



Q3 (b)	Solve one of the following problems with dynamic programming. -Define the Problem -Define optimal substructure -Write the recursive formula -Compute the answer -Construct the answer -State the answer(s) clearly -Write complexity Problem 1: 0/1 knapsack N=6, M=10. P={3,12,5,60,14,4} , W= {2,4,3,6,5,2} **OR** Problem 2: Travelling salesperson problem	10

0	10	15	20
5	0	9	10
6	13	0	12
8	8	9	0

Q4 (a)	For the given graph, compute the minimum chromatic number to color the graph such that no two adjacent vertices have the same color. Give all possible combinations of such color assignments using backtracking. Draw state space tree and backtracking tree both. **OR** Define N-Queen's problem. Explain need of backtracking concept by using state space tree and backtracking tree for 4-Queen's problem.	10
Q4 (b)	Define 15-puzzle problem. Explain solutioning using Least Cost Branch & Bound search.Solve given example	10

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Q5 (a)	solve the following string matching problem using Longest common subsequence problem X= compatibility Y= optimality	10
Q5 (b)	Explain string matching with finite automata algorithm with an example. **OR** Explain the concept of Naïve string matching algorithm. Use the algorithm to find all the occurrences of Pattern =Offer in Text = CourseOffered .	10