

S.E. (Comp) (Sem-IV) (CBCGS) (R2016) 92373

Analysis of Algorithms

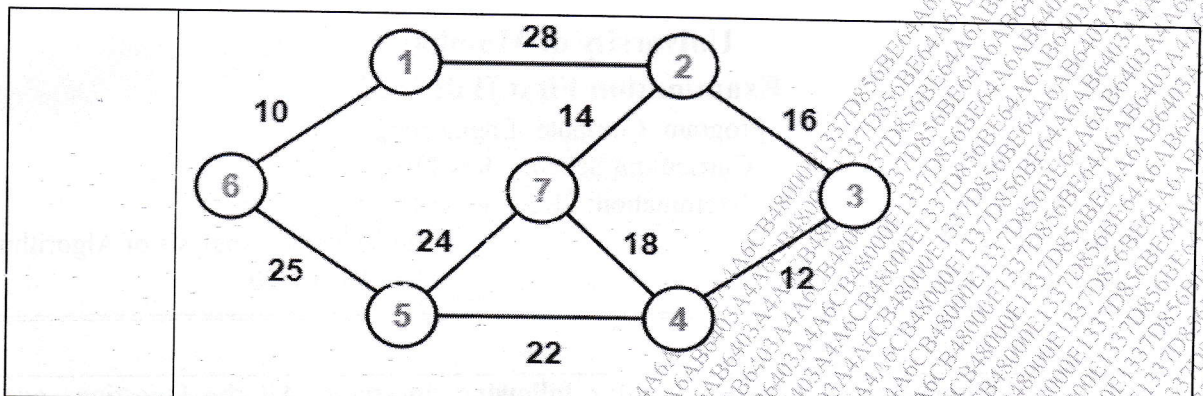
University of Mumbai
Examination First Half 2022

Program: Computer Engineering
Curriculum Scheme: Rev2016
Examination: SE Semester IV

Course Code: CSC402
Time: 2 hour 30 minutes

Course Name: Analysis of Algorithms
Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The cost of a spanning tree is equal to:
Option A:	The sum of costs of the vertices of the tree
Option B:	The sum of costs of the edges of the tree
Option C:	The sum of costs of the edges of the graph
Option D:	The sum of costs of the edges and vertices of the tree
2.	The class of decision problems that can be solved by non-deterministic polynomial algorithms are called as.
Option A:	NP
Option B:	P
Option C:	Hard
Option D:	Complete
3.	Reorder the following complexity from smallest to largest
	1. $n \log_2(n)$
	2. $n+n^2+n^3$
	3. 2^4
	4. \sqrt{n}
Option A:	(1,2,3,4)
Option B:	(2,4,3,1)
Option C:	(3,4,1,2)
Option D:	(4,3,1,2)
4.	Which of the following problem can be solved using greedy approach?
Option A:	N-queens problem
Option B:	All pairs shortest path problem
Option C:	Job sequencing with deadlines
Option D:	Multistage graph problem
5.	For the following graph, choose the correct order(s) in which edges are getting selected to form a minimum spanning tree using Prim's Algorithm



Option A:	(1,6), (3,4), (2,7), (2,3), (4,5), (6,5)
Option B:	(4,3), (3,2), (2,7), (1,6), (6,5), (5,4)
Option C:	(5,4), (4,3), (3,2), (2,7), (2,3), (4,5)
Option D:	(1,6), (6,5), (5,4), (4,3), (3,2), (2,7)

6.	Apply Quick sort on a given sequence 6, 10, 5, 11, 25. What is the sequence after first phase, pivot is middle element?
Option A:	6, 10, 5, 11, 25
Option B:	5, 10, 25, 11, 6
Option C:	5, 6, 10, 11, 25
Option D:	25, 11, 10, 6, 5

7.	The optimal solution for 4-queen problem is
Option A:	(2,3,1,4)
Option B:	(2,4,1,3)
Option C:	(1,3,2,4)
Option D:	(3,1,2,4)

8.	0/1 Knapsack can be solved using
Option A:	Greedy Method
Option B:	Dynamic Programming
Option C:	Back Tracking
Option D:	Branch and bound

9.	In which technique the previously calculated values are stored in memory
Option A:	Dynamic Programming
Option B:	Greedy Approach
Option C:	Divide and Conquer
Option D:	Backtracking

10.	Which of the following is a sub string of AABACDDCBBCAAC
Option A:	BADD
Option B:	ABCC
Option C:	ABCD
Option D:	DCBB

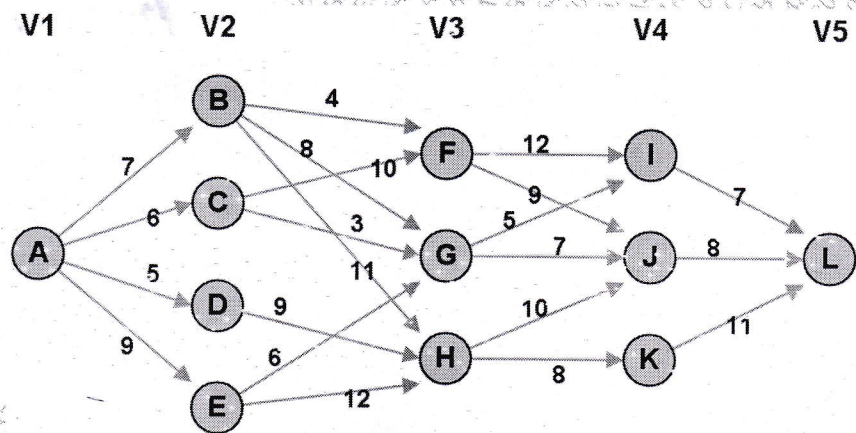
Q2 (20 Marks)	Solve any Four out of Six	5 marks each
A	Define Master Theorem. Solve $T(n)=T(n/2)+n^2$ using master method	
B	Write an Algorithm to find shortest path using dynamic programming.	
C	Write short note on optimal storage on tapes.	

D	What is Backtracking? Explain how it is used in Graph coloring.
E	Apply Rabin Karp string matching on following strings String1: AABABABCBCACABC String2: ABC
F	Define Asymptotic Notations.

Q3 (20 Marks)	Solve any Two Questions out of Three 10 marks each
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A	Explain sum of subset problem using backtracking approach..
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B	Find a minimum cost path from A to L in the following multistage graph
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C	Explain KMP algorithm with Example.
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Q4 (20 Marks)	Solve any Two Questions out of Three 10 marks each
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A	Sort the following array using quicksort algorithm: [10, 55, 9, 18, 1, 50, 7, 5]
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B	Define: P, NP, NP-complete Classes.
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C	Solve Fractional Knapsack Problem, $n=5$, $p=(15,8,11,9,5)$ $w=(8,3,7,5,3)$ $m=18$.
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