University of Mumbai
Examination 2020 under cluster 4 (Lead College: PCE, New Panvel)

Program: **Computer Engineering**
Curriculum Scheme: Rev2016
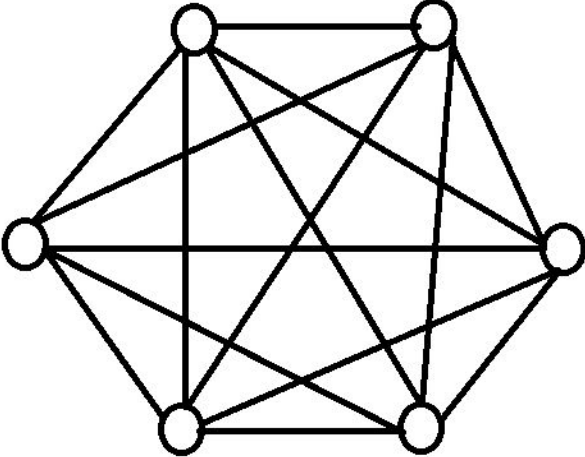Examination: Second Year Semester IV
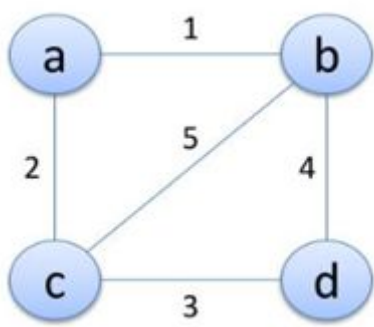Course Code: CSC402 and Course Name: Analysis of Algorithms

Time: 1 hour   Max. Marks: 50
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For the students:- All the Questions are compulsory and carry equal marks .

Q1.	Let G be a graph with 'n' nodes and let 'm' be the chromatic number of the graph. Then the time taken by the backtracking algorithm to color it is_____.
Option A:	O(m n m)
Option B:	O(m n 2m)
Option C:	O(m n 2n)
Option D:	O(n m n)
Q2.	The term _____ refers to all state space search methods in which all children of the –nodes are generated before any other live node can become the E-node.
Option A:	Branch & Bound
Option B:	Backtracking
Option C:	Breadth First Search
Option D:	Depth First Search
Q3.	What happens when the backtracking algorithm reaches a complete solution?
Option A:	It backtracks to the root
Option B:	It continues searching for other possible solutions
Option C:	It traverses from a different route
Option D:	Recursively traverses through the same route
Q4.	Of the following given options, which one of the following is a correct option that provides an optimal solution for the 4-queens problem?
Option A:	(4, 3, 2, 1)
Option B:	(2, 3, 1, 4)
Option C:	(3, 1, 4, 2)
Option D:	(4, 2, 3, 1)
Q5.	Consider two strings A = "babcc" and B = "abacbca". Let x be the length of the longest common subsequence (not necessarily contiguous) between A and B and let y be the number of such longest common subsequences between A and B. Then x and y are:
Option A:	4, 3
Option B:	3, 4
Option C:	4, 2
Option D:	3, 2

Q6.	What will be the chromatin number for the below graph considering every circle as a node.
Option A:	3
Option B:	4
Option C:	5
Option D:	6
Q7.	How many solutions are possible for the following sum of subset problem & M = 35, W = {5, 7, 10, 12, 15, 18, 20}
Option A:	3
Option B:	3
Option C:	4
Option D:	5
Q8.	Spurious Hit occurs in which algorithm?
Option A:	Naive String Matching Algorithm
Option B:	Rabin Karp Algorithm
Option C:	Knuth Morris Pratt ALgorithm
Option D:	Longest Common Subsequence
Q9.	Find pattern = **"c b a b a b"** in the text = **"c b a c b a b c b a b a b a a b"** using naïve string matching approach.
Option A:	Pattern is not present
Option B:	Pattern is present from index position 0
Option C:	Pattern is present from index position 3
Option D:	Pattern is present from index position 7
Q10.	..... is the class of decision problems that can be solved by non-deterministic polynomial algorithms?
Option A:	NP
Option B:	P
Option C:	Hard
Option D:	Complete

Q11.	To which of the following class does a CNF-satisfiability problem belong?
Option A:	P Class
Option B:	NP Class
Option C:	NP Complete
Option D:	NP Hard
Q12.	Using brute force method how many combinations we need to check to find 4-clique in the below 7 vertex graph.
Option A:	28
Option B:	35
Option C:	840
Option D:	2401

Q13.	Algorithm Add(a, b, c, m, n)
	 {
	   for i = 1 to m do
	     for j = 1 to n do
	       c[i, j] = a[i, j] + b[i, j];
	 }
	
	 The complexity of the above given algorithm is

Option A:	$\Theta(m)$
Option B:	$\Theta(n)$
Option C:	$\Theta(m+n)$
Option D:	$\Theta(mn)$
Q14.	The best case complexity of insertion sort algorithm is
Option A:	$O(\log n)$
Option B:	$O(n)$
Option C:	$O(n \log n)$
Option D:	$O(n2)$
Q15.	Which of the following methods uses mathematical induction for solving recurrences?
Option A:	Substitution method
Option B:	Recursion-tree method
Option C:	Master method
Option D:	Iterative method
Q16.	Apply a master method to solve the given recurrence and identify the correct option. T(n) = 9T(n/3) + n.
Option A:	$T(n) = \Theta(n)$
Option B:	$T(n) = \Theta(n \log n)$
Option C:	$T(n) = \Theta(n2)$
Option D:	$T(n) = \Theta(\log n)$
Q17.	The average case complexity of Quick sort is

Option A:	O(n)
Option B:	O(log n)
Option C:	O(n log n)
Option D:	O(n2)
Q18.	Computation of the resultant matrix using Strassen's matrix multiplication method involves
Option A:	8 multiplications and 4 additions or subtractions
Option B:	7 multiplications and 18 additions or subtractions
Option C:	7 multiplications and 4 additions or subtractions
Option D:	8 multiplications and 18 additions or subtractions
Q19.	The minimum cost of the spanning tree for the given graph is
Option A:	2
Option B:	6
Option C:	7
Option D:	8
Q20.	Identify the maximum profit earned for the job sequencing with deadlines problem where, item : n={1, 2, 3, 4}, profit p={50, 60, 45, 65}, deadline d={1, 2, 3, 2}
Option A:	160
Option B:	175
Option C:	155
Option D:	170
Q21.	Identify the maximum profit earned by the following instance of the knapsack problem: n = 3, m = 17, (p1, p2, p3) = (25, 24, 15) and (w1, w2, w3) = (18, 15, 10).
Option A:	25
Option B:	24.25
Option C:	28.2
Option D:	27
Q22.	The longest common sequence for X = <ABABABBA> and Y = <BBABAAA> is
Option A:	ABAB

Option B:	AABB
Option C:	BABA
Option D:	AABA
Q23.	Identify the maximum profit earned by the following instance of the 0/1 knapsack problem. n=4, (w1, w2, w3, w4) = (2, 3, 5, 7) and (p1, p2, p3) = (3, 4, 5, 6) and m=5 kg.
Option A:	6
Option B:	7
Option C:	8
Option D:	9
Q24.	Which of the following problems should be solved using dynamic programming?
Option A:	Quick sort
Option B:	Optimal storage on tapes
Option C:	Longest common subsequence
Option D:	Binary search
Q25.	Bellman Ford algorithm is used to find ------
Option A:	Minimum cost spanning tree
Option B:	All pairs shortest path
Option C:	Optimal storage on tapes
Option D:	Single source shortest path