CONTINOUS INTERNAL EVALUATION- 3

Dept: CSE	Sem / Div:4th(A&B)	Sub:Design and Analysis of Algorithms	S Code:18CS42
Date:04/08/2021	Time:3-4.30 PM	Max Marks: 50	Elective:N
Note: Answer any 2 full questions, choosing one full question from each part.			

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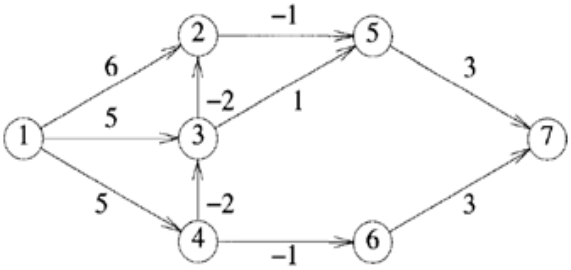
QN		Questions	Marks	RBT	COs
		PART A			
1	a	Write Bellman-ford Algorithm. Apply same to the graph given below, to find shortest path to all the vertices from vertex 1 	12	L3	CO4
	b	Solve the following TSP using dynamic programming and write the Complexity. $\begin{bmatrix} 0 & 10 & 15 & 20 \\ 5 & 0 & 9 & 10 \\ 6 & 13 & 0 & 12 \\ 8 & 8 & 9 & 0 \end{bmatrix}$ starting city 1	13	L3	CO4
		OR			
2	a	Design a 3-stage system with device types A, B, C whose costs are 30, 15, 20 and reliability are 0.9, 0.8, 0.5 respectively. Budget available is 105. Design a system with highest reliability.	12	L4	CO4
	b	Solve the following instance of 0/1 knapsack problem using dynamic programming. Knapsack capacity is W=5 and n=4	13	L3	CO4

Item	Weight	Value
1	2	12
2	1	10
3	3	20
4	2	15

		PART B			
3	a	Give the problem statement of n-queens problem. Explain the solution for 4-queens problem using state space tree.	10	L2	CO5
	b	Let w = {3, 5, 6, 7} and m =15. Find all possible subsets of w that sum to m. Draw the state space tree that is generated.	5	L1	CO5

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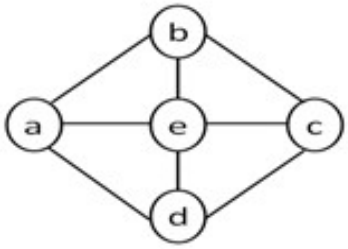
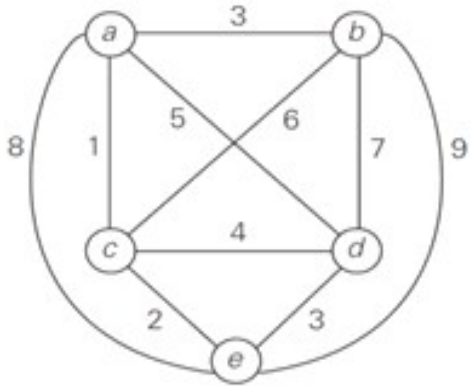
	c	Define Graph coloring problem. Apply backtracking to solve the 3-coloring problem for the graph given below. 	10	L3	CO5
		OR			
4	a	Apply best-first branch and bound method for the following instance of assignment problem to find the optimal solution. Give the complete state space tree Job 1 Job 2 Job 3 Job 4 9 2 7 8 Person a 6 4 3 7 Person b 5 8 1 8 Person c 7 6 9 4 Person d	10	L3	CO5
	b	Explain the following with examples a. Class P Problems b. Class NP Problems	5	L2	CO5
	c	Apply the branch-and-bound algorithm to solve the travelling sales man problem for the following graph. Start city is *a*. Give the state space tree. 	10	L3	CO5