U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

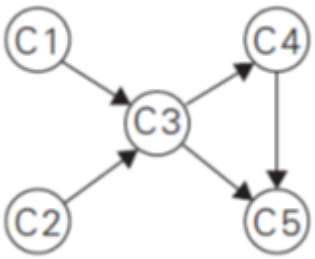
Autonomous Institute Affiliated to VTU

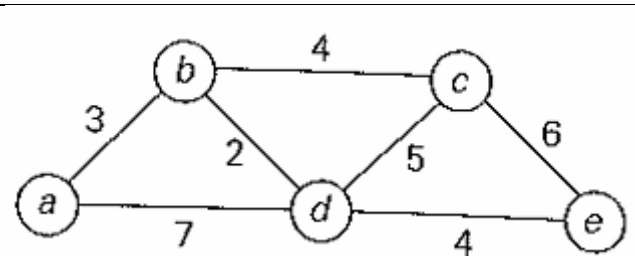
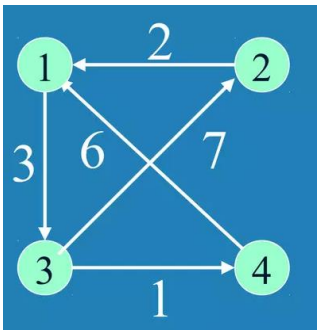
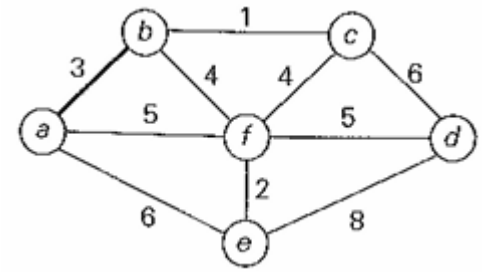
October 2024 Supplementary Examinations

Programme: B.E. **Semester: IV**
Branch: Information Science and Engineering **Duration: 3 hrs.**
Course Code: 23IS4PCADA **Max Marks: 100**
Course: Analysis and Design of Algorithms

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Explain asymptotic notations to measure efficiency of an algorithm.	CO2	-	4
	b)	Explain general plan for analyzing efficiency of recursive algorithms and apply same to find time complexity for Tower of Hanoi problem.	CO2	PO2	8
	c)	Write the bubble sort algorithm. Apply the same to sort the list of elements {16, 12, 18, 4, 10} in ascending order and compute the maximum number of comparison required to sort those elements.	CO2	PO1	8
		UNIT - II			
2	a)	Write the quick sort algorithm and discuss its complexity. Sort the list '**EXAMPLE**' in alphabetical order using quick sort.	CO2	PO1	12
	b)	Differentiate between DFS and BFS with examples.	CO1	PO2	8
		OR			
3	a)	Write the Mergesort algorithm and discuss its efficiency. Sort the array of elements {**9,3,7,5,2,4,8,6}** using Mergesort.	CO2	PO1	12
	b)	Write and explain topological sort procedure and apply source removal method to find topological order for the following graph. 	CO1	PO1	8
		UNIT - III			
4	a)	Write single-source shortest path algorithm. Apply the algorithm on the following graph, with vertex "a" as the source.	CO1	PO1	10

						
	b)	Write Floyd's algorithm and apply the same to solve the following problem. 	*CO3*	*PO1*	**10**
		OR			
5	a)	Apply Prims algorithm to find minimal cost spanning tree for the following graph. Also, Write the algorithm. 	*CO1*	*PO1*	**10**
	b)	Apply Knapsack algorithm using dynamic programming to find an optimal solution for the given instances: (Capacity of the Knapsack =5). **Item wt val** 1 2 12 2 1 10 3 3 20 4 2 15	*CO3*	*PO1*	**10**
		UNIT - IV			
6	a)	Construct an AVL Tree for the following set of elements: **{1, 2, 3, 4, 5, 6, 7}**	*CO1*	*PO1*	**6**
	b)	Define Heap and explain the process to construct Heap.	*CO1*	-	**6**
	c)	Write Boyer-Moore matcher algorithm. Apply same algorithm to search for the pattern BARBER in the text JIM-SAW-ME-IN-A-BARBERSHOP.	*CO1*	*PO1*	**8**
		UNIT - V			
7	a)	Use backtracking method to solve subset-sum problem for the instance d=30 and S= {5,10,15,20,25}.	*CO3*	*PO1*	**4**

		b)	Find the optimal solution for the following Job Assignment problem using branch-and-bound technique. J1 J2 J3 J4 P1 9 2 7 8 P2 6 4 3 7 P3 5 8 1 8 P4 7 6 9 4	***CO3***	***PO1***	**8**
		c)	Use branch-and-bound technique to find optimal solution for the given Knapsack problem where capacity =10**.** **Item wt val** 1 4 40 2 7 42 3 5 25 4 3 12	***CO3***	***PO1***	**8**

****