

Day and Date: Monday, 05.12.2022

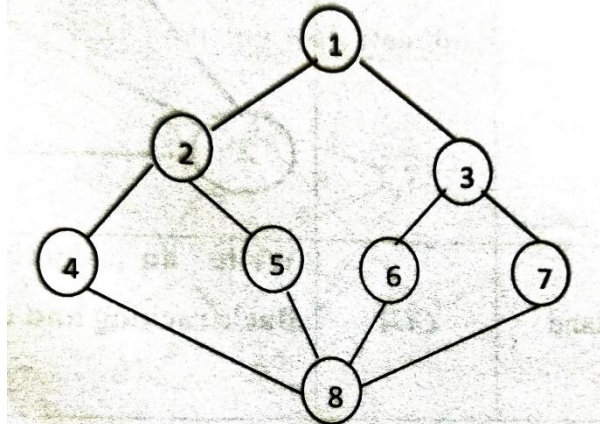
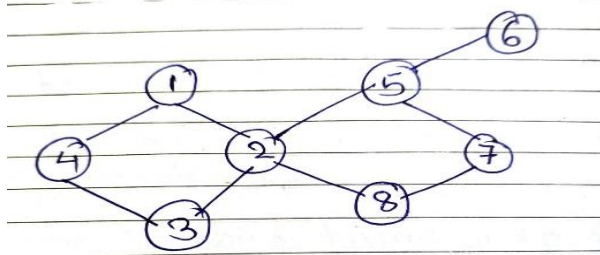
Time: 2.00 pm to 4.00pm

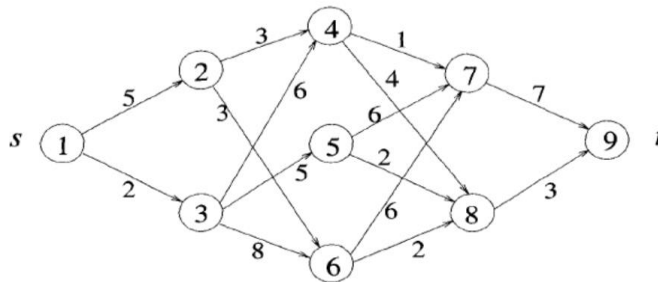
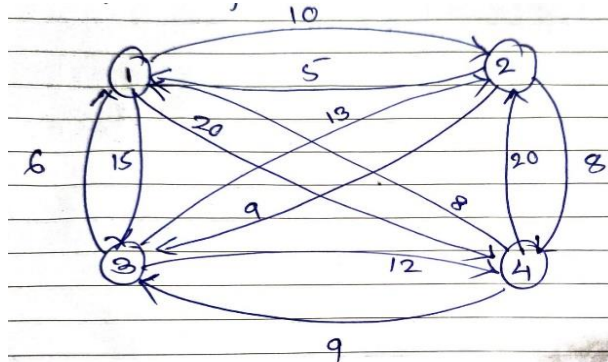
Seat No:

Max. Marks- 50

Instructions:

- i. Figure to the right indicate full marks.

BT	CO's	Q. No.		Marks
		Q.1	All Questions are compulsory	20
3	CO1, CO2	a	Write an algorithm for the min-max problem using the divide-and-conquer approach. Show that its time complexity is $O(3n/2)$.	6M
3	CO1	b1	What is the solution generated by job sequencing when $n=7$, $(p_1, \dots, p_7)=(3,5,20,18,1,6,30)$ and $(d_1, \dots, d_7)=(1,3,4,3,2,1,2)$?	4M
		b2	Explain the greedy approach and its control abstraction.	3M
3	CO1	c	Explain the graph coloring problem using the backtracking approach. Write its algorithm.	7M
		Q.2	All Questions are compulsory.	10
4	CO3	a	What data structures are used to implement BFS and DFS? Apply BFS traversal to the given graph. Also, identify and mention whether the graph is connected or not. 	4
4	CO3	b	Define the articulation point from the following graph and identify articulation point using DFS spanning tree. 	6

2			<div>OR</div> <div>Describe traversal techniques for graphs with algorithms.</div>		
		Q.3	All Questions are compulsory		10
4	CO3	a	Solve the following instance of knapsack 0/1 problem where (w_1, w_2, w_3, w_4)=(10,15,6,9) and (p_1, p_2, p_3, p_4)=(2,5,8,1) where knapsack capacity $m=11$.		3
4	CO3	b	Find the minimum cost path from s to t in the multistage graph using the forward approach. <div></div> <div>OR</div> <div>Solve the following problem on the Travelling Salesperson problem with 1 as the source node.</div> <div></div>	7	
		Q.4	Attempt any two out of three questions		10
2	CO4	a	Define P and NP problems. Explain relationship between P, NP, NP complete and NP hard problems with neat diagram.		5
2	CO4	b	Explain Clique decision problem and show that Clique decision problem is NP-Hard.		5
2	CO4	C	Explain AND/OR graph decision problem.		5
