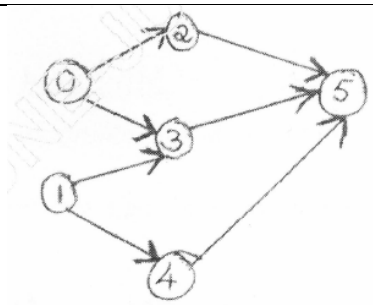
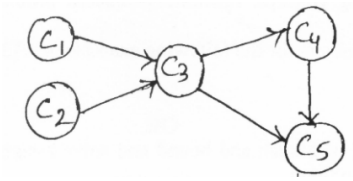
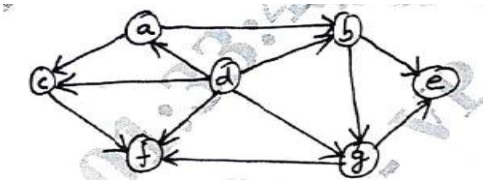
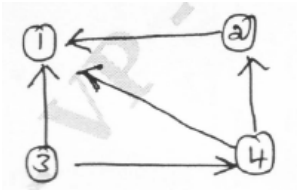
Module-2: Divide and Conquer
Review Questions

Sl. No.	Questions	Marks	Exam
General Method, Solving Recurrence equations			
1	Explain the general concept of divide and conquer method. Give the general algorithm DAndC(P) [Where P is the problem to solve] to illustrate this technique. Discuss general divide and conquer technique with control abstraction and recurrence relation.	5	Jul 19, Jul 18, Jul 17
2	List the advantages and disadvantages of Divide and Conquer.	4	Jul 17
3	Find the upper bound of recurrences given below by substitution method. i) $T(n) = 2\,T(n/2)+n$ ii) $T(n) = T(n/2) + 1$	8	
4	Explain the general method of substitution method to solve the recurrence equation.	6	
5	State and explain master theorem to solve the recurrence equation.	5	
6	Consider Tower of Hanoi puzzle. Derive the recurrence relation for the total movement of disk. Solve the recurrence relation using substitution method	6	
Binary Search, Max and Min			
7	Show how **binary search** problem can be solved using the divide and conquer method. Write an algorithm for binary search and find average case efficiency.	6	Jul 17, Jul 19, Jan 20
8	Design an algorithm to find the **maximum and minimum** element in a given list of n numbers using divide and conquer method.	8	Jan 18 Jul 18
Merge Sort, Quick Sort			
9	Write the algorithm for **Merge Sort**. Illustrate with an example. Derive the time efficiency (best case, average case, worst case) of the algorithm.	8	Jul 18 Jan 19 Jul 19
10	Sort the following elements using **merge sort.** Write the recursion tree. 70, 20, 30, 40, 10, 50, 60 Alternatively: Use D & C method to sort the numbers which divides problem size by considering position		

11	Write algorithm for Merge Sort and Trace 60, 50, 25, 10, 35, 25, 75, 30.		Jan 20
12	Write an algorithm for sorting the numbers using **Quick sort**. Derive the best case, worst case, average case time efficiency of the algorithm.	8	Jan 19, Jul 19, Jan 20
13	Discuss how quick-sort works to sort an array and trace for the following dataset. Draw the tree of recursive calls made. 65, 70, 75, 80, 85,60, 55, 50, 45	8	Jul 18 Jan 19
14	Illustrate the tracing of quick sort algorithm for the following set of numbers: 25, 10, 72, l8, 40, 11, 64, 58, 32, 9	8	Jul 17
15	Sort the list E, X, A, M, P, L, E in alphabetical order using the Quick Sort algorithm. Draw the tree of recursive call.	8	Jan 18
16	Trace the quicksort algorithm for following list in ascending order 80, 60, 70, 40, 10, 30, 50, 20	8	Jul 19
Decrease and Conquer, Topological Sorting			
17	Define best case, worst case and average case efficiency. Write the algorithm and give these efficiencies for Insertion sort.	8	
18	Define best case, worst case and average case efficiency. Write the algorithm and give these efficiencies for DFS and BFS.	8	
19	What are the three major variations of decrease and conquer technique? Explain with an example for each.	6	Jan 19
20	Explain topological sorting with example.	6	Jan 20
21	Apply source removal method to obtain topological sort for the given graph.	6	Jul 18

			
22	Illustrate the topological sorting for the following graph. 	6	Jul 17
23	Apply DFS for below graph to solve to topological sorting. 	6	Jan 20
24	Apply DFS for below graph to solve to topological sorting. 	6	Jul 19