GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
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QUESTIONBANK(DESCRIPTIVE)

Subject Name withCode:ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS (23A05302T)

Course&Branch:Year&Semester:II-I**Regulation:**RG23

UNIT - I

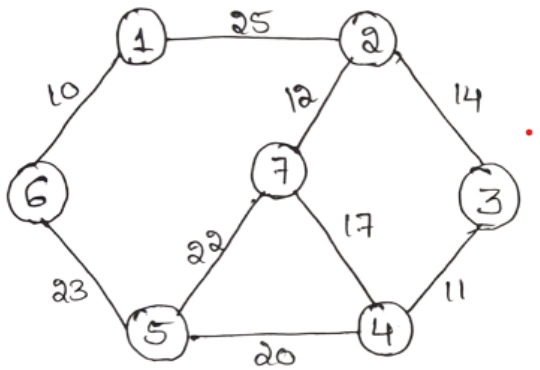
S.No.	Question	[BT Level] [CO][Marks]
2 Marks Questions (Short)		
1.	What is an algorithm?	L1, CO1,2M
2.	What are the algorithm characteristics?	L1, CO1,2M
3.	What are the algorithm specifications?	L1, CO1,2M
4.	Define Space Complexity.	L1, CO1,2M
5.	Define Time Complexity.	L1, CO1,2M
6.	Define Asymptotic Notations.	L1, CO1,2M
7.	Define Big-Oh notation (O).	L1, CO1,2M
8.	Define Omega notations(Ω.	L1, CO1,2M
9.	Define Theta notation (θ).	L1, CO1,2M
10.	What are Applications of A VL Trees?	
Descriptive Questions (Long)		
1	Explain about algorithm and algorithm characteristics.	**L2,CO1,10M**
2	Explain about Space and Time Complexity analysis.	**L2,CO1,10M**
3	Analyze the Asymptotic Notations:Big-oh notation(O),Omega notation(Ω),Theta notation(θ).	**L4,CO1,10M**
4	Explain about AVL Trees and its operations.	**L2,CO1,10M**
5	Illustrate the AVL Tree rotations with examples.	**L3,CO1,10M**
6	Apply the AVL Tree rotations for the given elemets.1,2,3,4,5,6,7,8	**L3,CO1,10M**
7	Explain about B-Trees and its operations.	**L2,CO1,10M**
8	Construct the B-Tree for the given elements with order-5 45,96,3,127,68,11,69,72,35,76,90,48,55,23,111,79,6	**L3,CO1,10M**

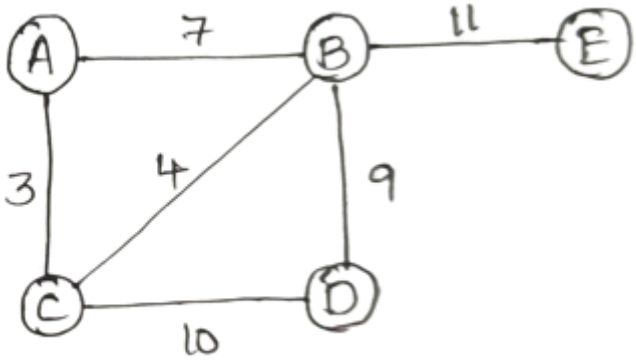
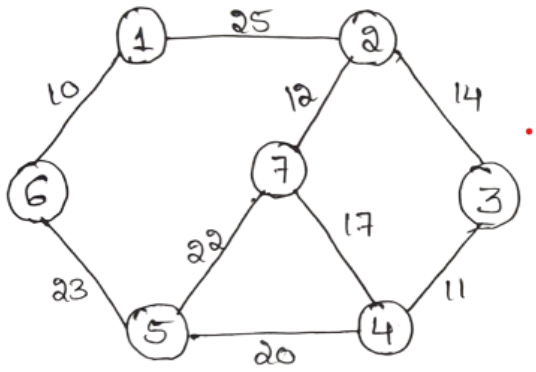
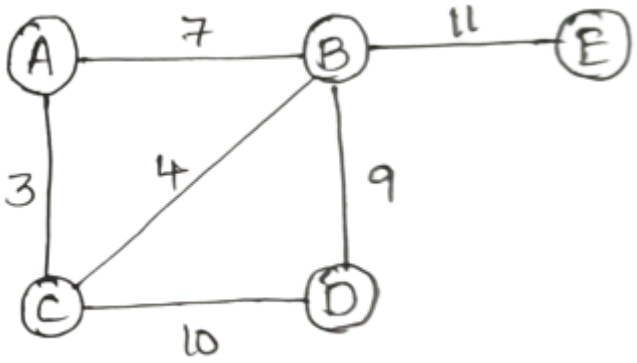
UNIT - II

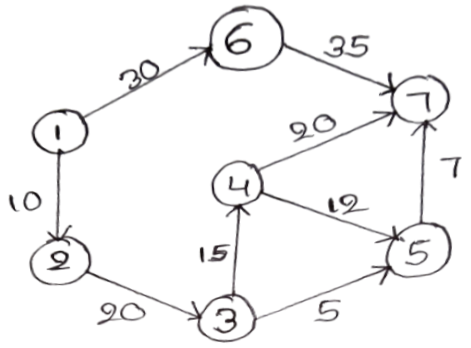
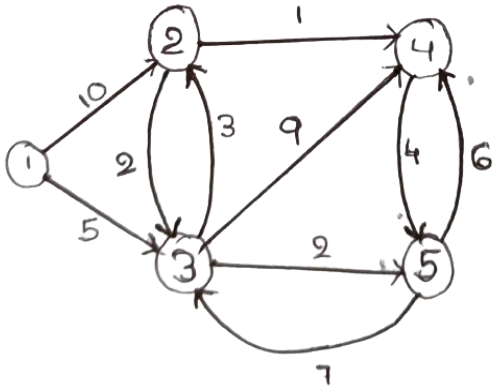
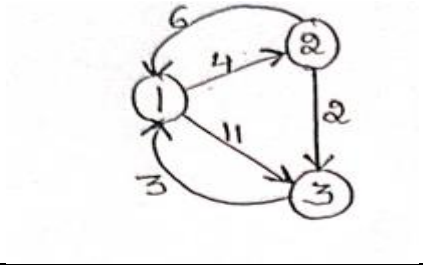
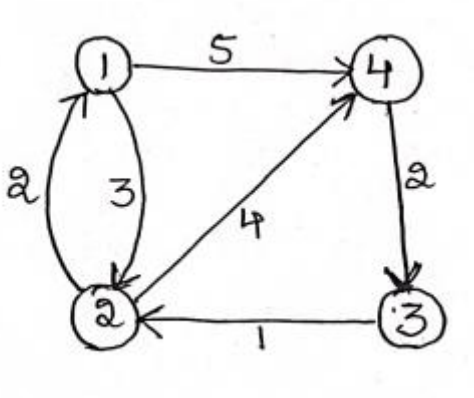
S.No.	Question	[BT Level] [CO][Marks]
2 Marks Questions (Short)		
1.	Define Heap Tree.	**L1,CO2,2M**
2.	Define Min Heap.	**L1,CO2,2M**
3.	Define Max Heap.	**L1,CO2,2M**
4.	Define Graph.	**L1,CO2,2M**
5.	List out representations of Graphs.	**L1,CO2,2M**
6.	List out graph travelling techniques.	**L1,CO2,2M**
7.	Define Connected Components with example.	**L1,CO2,2M**
8.	Define Bi connected Components with example.	**L1,CO2,2M**
9.	Define Convex Hull.	**L1,CO2,2M**
10.	What is the complexity of best, worst, average case of Merge sort?	**L1,CO2,2M**
11.	What is the complexity of best, worst, average case of quick sort?	**L1,CO2,2M**
Descriptive Questions (Long)		
1	Explain about operations of Heap Tree and construct the Heap tree for the given elements.46,61,100,5,1,98	**L2,CO2,10M**
2	Apply the Min Heap tree for the given elements 44,33,77,11,55,88,66	**L3,CO2,10M**
3	Explain about Representations of graphs.	**L2,CO2,10M**
4	Explain about Connected Components and Bi connected Components.	**L2,CO2,10M**
5	Illustrate the graph traversal techniques.	**L3,CO2,10M**
6	Illustrate the Quick Sort and it's time complexity?	**L3,CO2,10M**
7	Illustrate the Merge Sort and it's time complexity?	**L3,CO2,10M**
8	Analyze the Strassen's matrix multiplication?	**L4,CO2,10M**
9	Explain about Convex Hull	**L2,CO2,10M**

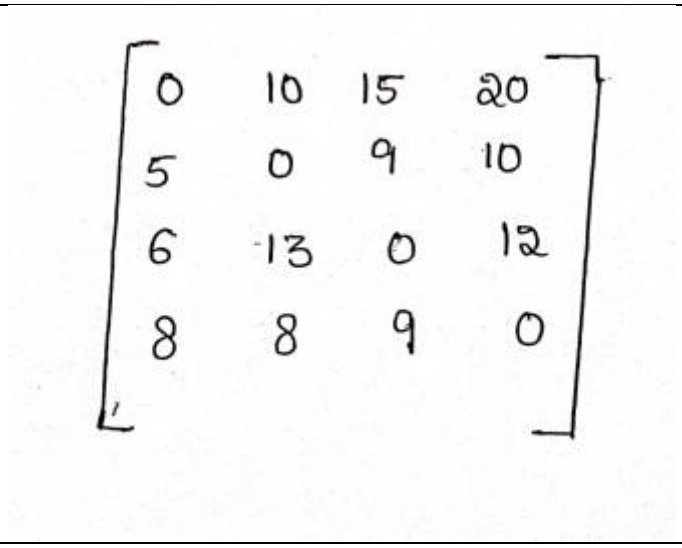
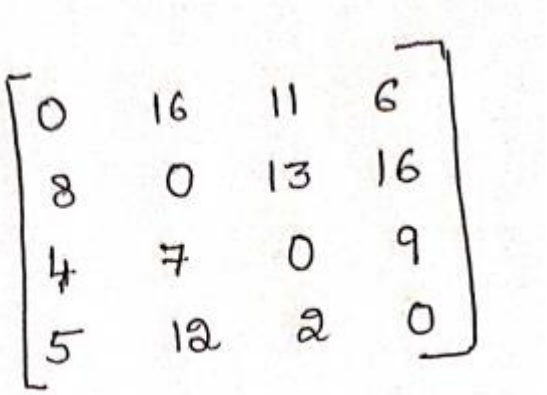
UNIT - III

S.No.	Question	[BT Level] [CO][Marks]
2 Marks Questions (Short)		
1.	Define General Greedy Method.	**L1, CO3, 2M**
2.	Define Job Sequencing with deadlines in Greedy Method.	**L1, CO3, 2M**
3.	Define Knapsack Problem in Greedy Method.	**L1, CO3, 2M**
4.	Define Minimum cost spanning tree.	**L1, CO3, 2M**

5.	Define Single Source Shortest Paths problemin Greedy Method.	**L1, CO3, 2M**
6.	Define the Principle of Optimality.	**L1, CO3, 2M**
7.	Define All pair's shortest path problemin Dynamic Programming.	**L1, CO4, 2M**
8.	What are the Applications of greedy method.	**L1, CO4, 2M**
9.	Define Optimal Binary Search Trees in Dynamic Programming.	**L1, CO4, 2M**
10.	Write problem statement of 0/1 Knapsackproblem in Dynamic Programming.	**L1, CO4, 2M**
11.	Define Travelling Salesperson problem in Dynamic Programming.	**L1, CO4, 2M**
12.	What are the Applications of Dynamic Programming?	**L1, CO4, 2M**
Problems (Long)		
1	Write the algorithm for Fractional Knapsack. Apply the fractional knapsack problem for given problem: Objects n=5, Knapsack Capacity M=100,objects are (P1,P2,P3,P4,P5)=(20,30,66,40,60), weights are (W1,W2,W3,W4,W5)=(10,20,30,40,50).	**L3,CO3,10M**
2	Write the algorithm for Fractional Knapsack.Apply the fractional knapsack problem for given problem: n=7,Knapsack Capacity M=15, objects are (P1,P2,P3,P4,P5,P6,P7)=(10,5,15,7,6,18,3), (W1,W2,W3,W4,W5,W6,W7)=(2,3,5,7,1,4,1).	**L3,CO3,10M**
3	Write the algorithm for the Job sequencing with deadlines. Apply the job sequencing with deadlines for given problem: n=5 jobs, (P1, P2, P3, P4, P5) = (100,19,38,27,52), deadlines (d1, d2,d3, d4, d5) = (2,1,2,1,3).	**L3,CO3,10M**
4	Write the algorithm for the Job sequencing with deadlines. Apply the job sequencing with deadlines for given problem: n=5 jobs, (P1, P2, P3, P4, P5) = (20,13,10,4,1), deadlines (d1, d2,d3, d4, d5) = (2,1,2,3,3).	**L3,CO3,10M**
5	Write the Prim's algorithm. Apply Prim's algorithm on the given graph 	**L3,CO3,10M**
6	Apply the Prim's algorithm on the given graph.	**L3,CO3,10M**

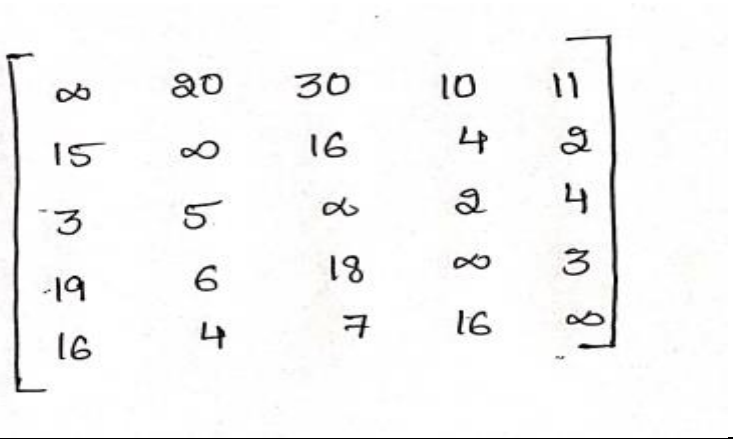
		
7	Write the kruskal's algorithm. Apply Kruskal's algorithm on the given graph: 	**L3,CO3,10M**
8	Write the Kruskal's algorithm. Apply Kruskal's algorithm on the given graph. 	**L3,CO3,10M**
9	Apply the Single Source Shortest Path problem on the given graph.	**L3,CO3,10M**

		
10	Apply the Single Source Shortest Path problem on the given graph. 	**L3,CO3,10M**
11	Solve the all pairs shortest path problem for given graph by using Dynamic Programming. 	**L3,CO4,10M**
12	Solve the all pairs shortest path problem for given graph by using Dynamic Programming. 	**L3,CO4,10M**
13	Solve the travelling sales person problem for the given problem by using Dynamic Programming.	**L3,CO4,10M**

		
14	Solve the travelling sales person problem for the given problem by using Dynamic Programming.  .	**L3,CO4,10M**
15	Apply the optimal binary search tree in given problem by using Dynamic Programming. N=4 (a1,a2,a3,a4)=(do,if,int,while) p(1:4)=(3,3,1,1) q(0:4)=(2,3,1,1,1)	**L3,CO4,10M**
16	Apply the 0/1 Knapsack problem for given problem n=3,M=6,(p1,p2,p3)=(1,2,5) (w1,w2,w3)=(2,3,4) by using Dynamic Programming.	**L3,CO4,10M**

UNIT - IV

S.No.	Question	[BT Level] [CO][Marks]
2 Marks Questions (Short)		
1.	Define general method of Backtracking.	L1,CO5,2M
2.	What is the solution vector for 8-queens problem in Backtracking?	L2,CO5,2M
3.	Define the Sum of subsets problem in Backtracking.	L1,CO5,2M
4.	What is the Graph colouring problem in Backtracking?	L2,CO52M
5.	List out the applications of Backtracking.	L1,CO5,2M
6.	Define LIFO Branch and Bound search.	L1,CO5,2M
7.	Define FIFO Branch and Bound search.	L2,CO52M
8.	Define LCBB search.	L1,CO5,2M
9.	What are the applications of Branch and Bound	L2,CO5,2M
Descriptive Questions (Long)		
1	Apply the 8-Queens problem in Backtracking.	L3,CO5,10M
2	Explain about Graph colouring in Backtracking.	L2,CO5,10M
3	Examine the Sum of subsets problem in Backtracking for given problem. N=4,(w1,w2,w3,w4)=(11,13,24,7) M=31	L3,CO5,10M
4	Construct the state space tree for 0/1 Knapsack problem	L3,CO5,10M

	N=4, m=8,(W1,W2,W3,W4)=(2,3,4,5) (P1,P2,P3,P4)=(3,5,6,10)	
5	Analyze the method of reduction to solve TSP problem using branch and bound to the given problem.  	L4,CO5,10M
6	Apply the 0/1 knapsack problem- LC branch and bound solution for the given problem. Consider the instance M=15, n=4, (P1,p2,p3,p4) = 10, 10, 12, 18 and (w1,w2,w3,w4)=(2,4, 6, 9)	L4,CO5,10M
7	Compare FIFO branch and bound and LC branch and bound.	L4,CO5,10M

UNIT - V

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S.No.	Question	[BT Level] [CO][Marks]
2 Marks Questions (Short)		
1.	Define the NP-Hard problem.	**L1,CO6,2M**
2.	Define the NP-Complete problems.	**L1,CO6,2M**
3.	Define Cook's theorem.	**L1,CO6,2M**
4.	Define NP Hard Graph Problems.	**L1,CO6,2M**
5.	Define NP Hard Scheduling Problems.	**L1,CO6,2M**
6.	Define CDP.	**L1,CO6,2M**
7.	Define CNDP.	**L1,CO6,2M**
Descriptive Questions (Long)		
1	Explain about the classes of P,NP, NP-Hard and NP-Complete problems.	**L2,CO6,10M**
2	Explain about the Deterministic and Non Deterministic algorithms.	**L2,CO6,10M**
3	Explain about Cook's theorem	**L2,CO6,10M**
4	Explain about Clique Decision Problem (CDP) in NP Hard Graph Problems.	**L2,CO6,10M**
5	Explain about Chromatic Number Decision Problem (CNDP) in NP Hard Graph Problems.	**L2,CO6,10M**
6	Explain about Traveling Salesperson Decision Problem (TSP) in NP Hard Graph Problems.	**L2,CO6,10M**
7	Explain about NP Hard Scheduling Problems	**L2,CO6,10M**

Signature of the Staff:

Signature of Department Academic Committee Member 1:

Signature of Department Academic Committee Member 2:

Signature of Department Academic Committee Member 3: