Department of CSE(AI&ML)

B. Tech Mid Question Bank (R22 Regulation)

Academic Year: 2024-25 **Semester: V**

Subject Name: Design & Analysis of Algorithms

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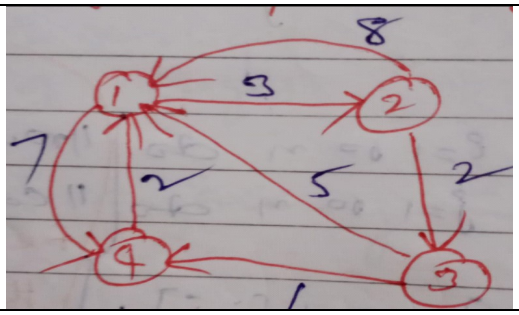
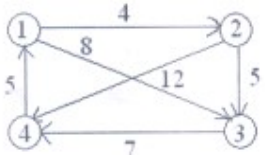
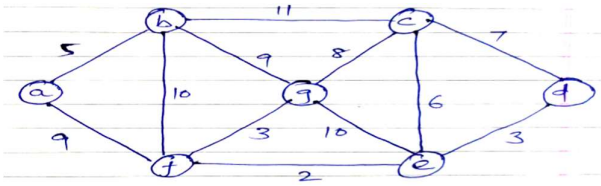
PART-A

MID-I Questions					
Q.No	**Questions**	**Marks**	**BL**	**CO**	**Unit No**
1	Define algorithm.	2	L1	CO1	1
2	Define order of an algorithm and the need to analyse the algorithm.	2	L1	CO1	1
3	What is space complexity ?	2	L1	CO1	1
4	List the asymptotic notations.	2	L1	CO1	1
5	List the applications of Divide and conquer method.	2	L1	CO1	1
6	Define the time complexity.	2	L1	CO1	1
7	Define Graph.	2	L1	CO2	2
8	What is sum of subsets problem?	2	L1	CO2	2
9	Write an algorithm of simple union.	2	L1	CO2	2
10	List the applications of backtracking.	2	L1	CO2	2
11	What is priority- Queue Heap?	2	L1	CO2	2
12	What is time complexity of heap sort?	2	L1	CO2	2
13	Define State space tree.	2	L1	CO3	3
14	List the application of dynamic programming.	2	L1	CO3	3
15	What is traveling sales person problem?	2	L1	CO3	3
MID-II Questions					
16	What is the importance of knapsack algorithm in our daily life?	2	L1	CO3	3
17	Define optimal binary search tree with an example.	2	L1	CO3	3
18	What do you mean by dynamic programming?	2	L1	CO3	3
19	List the applications of greedy method.	2	L1	CO4	4
20	What is complete binary tree ? Give an example.	2	L1	CO4	4
21	List the tree traversal methods with an example.	2	L1	CO4	4
22	What is AND/OR graph?	2	L1	CO4	4
23	Define articulation point	2	L1	CO4	4
24	Give brief description on greedy method.	2	L1	CO4	4
25	List the applications of branch and bound.	2	L1	CO5	5
26	What is minimum spanning tree?	2	L1	CO5	5
27	What do you mean by bounding?	2	L1	CO5	5
28	State the difference between FIFO and LC Branch and Bound algorithms .	2	L1	CO5	5

29	What is NP-hard problem?	2	L1	CO5	5
30	What is meant by non-deterministic algorithm?	2	L1	CO5	5

PART-B

MID-I Questions					
Q.No	**Questions**	**Marks**	**BL**	**CO**	**Unit No**
1	What is an algorithm? Explain its characteristics.	4	L2	CO1	1
2	Discuss various asymptotic notations used for best case average case and worst case analysis of algorithms	4	L2	CO1	1
3	Explain the Strassen's matrix multiplication.	4	L2	CO1	1
4	Write an algorithm for quick sort Technique. Ex:7,2,1,6,8,5,3,4.	4	L3	CO1	1
5	Write an algorithm for merge sort. Explain with an example	4	L3	CO1	1
6	Explain the Strassen's matrix multiplication.	4	L2	CO1	1
7	Why do we use asymptotic notations in the study of algorithms? Briefly describe the commonly used asymptotic notations.	8	L2	CO1	1
8	Show the results of running Quick sorting technique on the sequence 38,27,43,3,9,82,10.and derive the average case time complexity.	8	L3	CO1	1
9	Describe the master's theorem. and solve the following recurrence relation by using master's theorem a) T(n)=4T(n/2)+n b) T(n)=2T(n/2)+nlogn	8	L3	CO1	1
10	Explain the Find algorithm with collapsing rule.	4	L2	CO2	2
11	Describe Union and Find algorithms.	4	L3	CO2	2
12	Write an algorithm of weighted union and also compute the time complexity of the same.	4	L2	CO2	2
13	Explain about the sum of subset problem with an example.	4	L3	CO2	2
14	Draw the state space tree for 'm' colouring when n=3 and m=3.	4	L3	CO2	2
15	Sort the following elements (82,90,10,12,15,77,55) by using Heap Sort Technique .	4	L3	CO2	2
16	Describe the Backtracking technique to the m-colouring graph. Explain with an example .	8	L3	CO2	2
17	Write an algorithm for the 8-queens problem using back tracking with an example.	8	L3	CO2	2
18	Find the sum of sub sets for the following sets of integers by using fixed tuple method.(5,10,12,13,15,18) For M=30	8	L3	CO2	2
19	Discussing about the dynamic programming .and find the all pairs shortest path following graph.	4	L2	CO3	3

					
20	Explain bellman ford algorithm for single source shortest method by using dynamic programming.	4	L2	CO3	3
21	What do you mean by forward and backward approach of problem solving in Dynamic Programming?	4	L2	CO3	3
	MID-I Questions				
22	Define merging and purging rules in 0/1 knapsack problem.	4	L2	CO3	3
23	Compute all pairs shortest path for following graph 	4	L3	CO3	3
24	Discuss about the Reliability design problem?	4	L2	CO3	3
25	Define spanningtree. with an example.	4	L2	CO4	4
26	Explain the prim's algorithm with an example.	4	L3	CO4	4
27	Discuss about the various binary tree traversal methods with an examples.	4	L3	CO4	4
28	Differentiate between greedy method and dynamic programming	4	L2	CO4	4
29	Explain the properties of connected and Bi-connected components.	4	L2	CO4	4
30	Discuss briefly about the minimum cost spanning tree.	4	L2	CO4	4
31	Explain about Kruskal's Algorithm and find out the Minimum Cost Spanning tree for the following graph using Kruskals Algorithm 	8	L3	CO4	4
32	Explain the problem of job sequencing with deadlines by taking an example. Write the algorithm to solve the problem using the Greedy Method. Show how the algorithm solves the following job sequencing with deadlines problem. n = 4, (p1, p2, p3, p4) = (100, 10, 15, 27) and (d1, d2, d3, d4) = (2,	8	L3	CO4	4

	1, 2, 1)				
33	Compute the optimal solution for knapsack problem using greedy method N=3, M= 20, (p1,p2,p3)= (25,24,15), (w1,w2,w3) =(18,15,10)	8	L3	CO4	4
34	Discuss about the satisfiability problem	4	L2	CO5	5
35	Differentiate between NP-complete and NP-Hard.	4	L2	CO5	5
36	Explain the non-deterministic sorting problem.	4	L2	CO5	5
37	Discuss the FIFO branch and bound.	4	L2	CO5	5
38	Solve the following knapsack instance, n=5, M=12 (P1P2P3P4P5) = (10,15,6,8,4) (W1W2W3W4W5) = (4,6,3,4,2) Using LIFO branch and bound.	4	L3	CO5	5
39	Explain the strategy to prove that a problem is NP hard.	4	L2	CO5	5
40	Solve the following instance of travelling sales person problem using Least Cost Branch Bound ∞ 12 5 7 11 ∞ 13 6 4 9 ∞ 18 10 3 2 ∞	8	L3	CO5	5
41	Draw the portion of state space tree generated by FIFO branch and bound for the knapsack instance, n=4 (p1, p2, p3, p4) = 10,10,12,18 (w1,w2,w3,w4)= 2,4,6,9 and M=15.	8	L3	CO5	5
42	Explain the classes of P ,NP and cook's theorem.	8	L2	CO5	5