

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech II Semester Supplementary Examinations, December-2024

DESIGN AND ANALYSIS OF ALGORITHMS**(COMPUTER SCIENCE ENGINEERING)****Time: 3 Hours****Max. Marks: 75****Section – A (Short Answer type questions)****(25 Marks)****Answer All Questions**

	Course Outcome	B.T Level	Marks
1. Define Big Oh, Omega and Theta.	CO1	L1	2M
2. Write algorithm for transpose of matrix (nxn) and find its time complexity.	CO1	L2	3M
3. What is min cost spanning tree? Can it be found for unconnected graphs?	CO2	L1	2M
4. Find time complexity of DFS in Graphs.	CO2	L2	3M
5. What is principle of optimality?	CO3	L1	2M
6. Write algorithm for All pair shortest path.	CO3	L2	3M
7. What are explicit and implicit constraints in Backtracking?	CO4	L1	2M
8. Write recursive Backtracking algorithm.	CO4	L2	3M
9. Define NP-Hard Problem.	CO5	L1	2M
10. Draw comparison tree for sorting three elements.	CO5	L2	3M

Section B (Essay Questions)**Answer all questions, each question carries equal marks.****(5 X 10M = 50M)**

11. A) Explain about various asymptotic notations used to assess the performance of algorithms using time complexity analysis.	CO1	L3	10M
OR			
B) The worst-case time of procedure merge sort is $O(n \log n)$. What is its best-case time? Can we say that the time for merge sort is $\Theta(n \log n)$.	CO1	L3	10M
12. A) Find optimal solution to the knapsack instance using greedy approach $n=7$, $m=15$, $(p_1 \dots p_7)=(10,5,15,7,6,18,5)$ and $(w_1 \dots w_7)=(2,3,5,7,1,4,1)$.	CO2	L3	10M
OR			
B) Write Prim's min cost spanning tree algorithm. What is its time complexity?	CO2	L3	10M
13. A) Construct optimal binary search tree for the following set of identifiers $(a_1, a_2, a_3, a_4)=(\text{count, float, if, while})$ with $P(1)=1/20$, $P(2)=1/5$, $P(3)=1/10$, $P(4)=1/20$ and $q(1)=1/10$, $q(2)=1/5$, $q(3)=1/20$, $q(4)=1/20$.	CO3	L3	10M
OR			
B) Discuss the Reliability Design problem using Dynamic programming.	CO3	L3	10M
14. A) Draw state space tree for mColoring when $n=3$ and $m=3$. Write algorithm for mColoring.	CO4	L3	10M
OR			
B) $N=4$, $(p_1, p_2, p_3, p_4)=(10,10,12,18)$, $(w_1, w_2, w_3, w_4)=(2,4,6,9)$ and $m=15$ find solution using FIFO Branch and Bound.	CO4	L3	10M

15. A) Explain the strategy to prove that a problem is NP hard. CO5 L3 10M
OR
B) Explain Node cover Decision Problem (NCDP). CO5 L3 10M