



**B.Tech IV Semester Regular Examinations, July 2024**

**DESIGN AND ANALYSIS OF ALGORITHMS**  
(INFORMATION TECHNOLOGY)

**Maximum Marks: 60**

Date:20.07.2024 Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
  3. Part B consists of 5 Units. Answer any one full question from each unit.
  4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A		CO	Bloom Tx
All the following questions carry equal marks (10X1M=10 Marks)			
1.a)	What are the performance analysis techniques of an algorithm.	CO1	L1
b)	Name two applications of the Divide and Conquer technique.	CO1	L1
c)	Write an algorithm for set union operation.	CO2	L1
d)	What is a Backtracking.	CO2	L1
e)	List two characteristics of Greedy algorithms.	CO3	L1
f)	Write the steps involved in applying the Greedy Method to solve the Knapsack problem.	CO3	L1
g)	List the advantages of dynamic programming.	CO4	L1
h)	Write about principle of optimality in shortest path problem.	CO4	L1
i)	List out the difference between NP hard and NP Complete problem.	CO5	L1
j)	Distinguish between backtracking and branch – and bound techniques.	CO5	L1
Part-B			
Answer All the following questions. (5X10M=50Marks)			Bloom Tx level
2	a) Demonstrate the general procedure of divide and conquer method. [5M]	CO1	L2
	b) Explain the theta notation used in algorithm analysis. [5M]	CO1	
OR			
3	a) Illustrate Quick sort algorithm and discuss its time complexity. [5M]	CO1	L2
	b) Explain the Strassen's matrix multiplication. [5M]	CO1	
4	a) Discuss sum-of-subsets problem. [5M]	CO2	L2
	b) Illustrate an algorithm for N – queen's problem. [5M]	CO2	
OR			
5	a) Demonstrate the solution to the m-coloring of a graph using backtracking. [5M]	CO2	L2
	b) Explain AND/OR graphs. [5M]	CO2	

6	a) Find the greedy solution for following job sequencing with deadlines problem $n = 7$ , $(p_1, p_2, p_3, p_4, p_5, p_6, p_7) = (3, 5, 20, 18, 1, 6, 30)$ , $(d_1, d_2, d_3, d_4, \dots, d_7) = (1, 3, 4, 3, 2, 1, 2)$ [5M]	CO3	L2
	b) Explain Prim's algorithm for minimal spanning tree with an example. [5M]	CO3	
	OR		
7	a) State the Greedy Knapsack? Find an optimal solution to the Knapsack instance $n=3$ , $m=20$ , $(P_1, P_2, P_3) = (25, 24, 15)$ and $(W_1, W_2, W_3) = (18, 15, 10)$ . [5M]	CO3	L2
	b) Discuss the difference between prim's and kruskal's algorithm for MST. [5M]	CO3	
8	a) Explain about Optimal Binary Search Tree with suitable example. [5M]	CO4	L2
	b) Explain All pairs shortest path algorithm with suitable example. [5M]	CO4	
	OR		
9	a) Explain 0/1 knapsack problem using dynamic programming with suitable example. [5M]	CO4	L2
	b) Explain Reliability Design Problem with suitable example. [5M]	CO4	
10	a) Explain 0/1 knapsack problem in Branch and Bound technique. [5M]	CO5	L2
	b) Explain non-deterministic algorithm for knapsack problem. [5M]	CO5	
	OR		
11	a) Explain an algorithm of FIFO Branch and Bound. [5M]	CO5	L2
	b) Write and explain the Cooks theorem. [5M]	CO5	