Code No: R2031463 **R20** SET - 1

III B. Tech I Semester Regular Examinations, Dec/Jan -2022-23
DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSE (CS), IOTCSIBCT, CSE(IOT), CS)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1. a) Explain in brief about Asymptotic notations with examples. [7M]
   b) Define Time and Space Complexity, and calculate the time space complexity for addition of two matrices. [7M]

(OR)

2. a) In what way amortized analysis is used for performance analysis of algorithms? Explain. [7M]
   b) Explain the method of determining the complexity of a procedure by the step count approach. Illustrate with an example. [7M]

UNIT-II

3. a) Write the merge sort algorithm and discuss its efficiency. [7M]
   b) Explain the general method of Divide and Conquer. [7M]

(OR)

4. a) Write the algorithm for finding pivot element in quick sort algorithm and analyze its time complexity. [7M]
   b) Explain How Master's theorem is useful for solving recurrence relations. [7M]

UNIT-III

5. a) Explain 0/1 knapsack problem with respect to dynamic programming. [7M]
   b) Derive the recursive formulas of optimal cost Binary search tree based on dynamic programming. [7M]

(OR)

6. a) Write an algorithm to explain matrix chain multiplication problem. [7M]
   b) Explain in detail about Multi stage graphs. [7M]

UNIT-IV

7. a) Relate Hamiltonian cycle with travelling sales person problem and also give the backtracking solution that finds all Hamiltonian cycles for any directed or undirected graph. [7M]
   b) Draw the portion of state space tree generated by recursive backtracking algorithm for sum of subsets problem with an example. [7M]

(OR)

8. a) Explain the Graph – coloring problem. And draw the state space tree for m= 3 colors and n=4vertices complete graph. [7M]
   b) b) Define Backtracking. Draw the state space tree for solution of 4-queens problem. [7M]

UNIT-V

9.	a)	Give and explain relationship between P, NP, NP complete and NP Hard.	[7M]
	b)	Explain Naïve String Matching algorithm and analyze the time complexity.	[7M]
		(OR)	
10.	a)	Write notes on deterministic and non-deterministic algorithm with example.	[7M]
	b)	State and prove Cook's theorem.	[7M]