Code No: R2031052 **R20** SET - 1

III B. Tech I Semester Supplementary Examinations, July – 2023
DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSE, IT)

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)	Differentiate performance measurement and performance estimation of algorithms.	[7M]
	b)	Write the pseudo code for expressing algorithms.	[7M]
		(OR)	
2.	a)	What are the Asymptotic notations? And give its properties.	[7M]
	b)	What are the features of an efficient algorithm? Explain with an example.	[7M]

UNIT-II

3.	a)	Write about quick sort method with example.	[7M]
	b)	Explain in detail merge sort. Illustrate the algorithm with a numeric example. Provide complete analysis of the same.	[7M]
		(OR)	
4.	a)	Derive the Best, Worst and Average time complexities of Merge sorting technique.	[7M]
	b)	Write about single source shortest path problem.	[7M]

UNIT-III

5.		Apply dynamic programming to obtain optimal binary search tree for the identifier set(a1, a2, a3, a4)=(cin, for, int, while) with (p1, p2, p3, p4)=(1, 4, 2, 1),(q0, q1, q2, q3, q4)=(4, 2, 4, 1, 1) and also write algorithm for its construction.	[14M]
		(OR)	
6.	a)	How to insert more number of jobs in feasible solution set J={ } to maximize the profit using greedy method? Explain algorithm.	[7M]
	b)	Write about 0/1 knapsack problem.	[7M]

UNIT-IV

7.	a)	Explain the algorithm for general iterative backtracking method and discuss various factors that define the efficiency of backtracking.	[7M]
	b)	Explain how backtracking is used for solving n- queens problem. Show the state space tree.	[7M]
		(OR)	

8. a) Construct an optimal travelling sales person tour using Dynamic Programming for the given data: [7M]

$$\begin{pmatrix} 0 & 10 & 9 & 3 \\ 5 & 0 & 6 & 2 \\ 9 & 6 & 0 & 7 \\ 7 & 3 & 5 & 0 \end{pmatrix}$$

b) Write the backtracking algorithm for the sum of subsets problem using the state space tree corresponding to m=35,w=(20,18,15,12,10,7,5). [7M]

UNIT-V

9. Write short note on the following: [14M]
   a) Vertex cover
   b) Independent set
   c) Set cover
   d) Steiner tree

(OR)

10. a) Explain about NP-complete problem with example. [7M]
    b) Explain FIFO Branch and Bound solution. [7M]