

Reg.No.:										
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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
 [AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
 Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 50036

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JAN. 2026

Fourth Semester

Computer Science and Engineering

U23CS408 - DESIGN AND ANALYSIS OF ALGORITHMS

(Common to IT)

(Regulation 2023)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Mention some of the important problem types that falls under $O(n)$ and $O(n \log n)$.	2	K2	CO1
2.	Define asymptotic Order of growth.	2	K1	CO1
3.	Interpret the importance of Huffman code.	2	K2	CO2
4.	State the time complexity of merge sort and quick sort under best and worst case.	2	K1	CO2
5.	Define principle of optimality.	2	K1	CO3
6.	Differentiate between greedy method and dynamic programming.	2	K2	CO3
7.	Define chromatic number of the graph.	2	K1	CO4
8.	Demonstrate 4-queens problem.	2	K2	CO4
9.	What is meant by NP complete problem? Provide two examples.	2	K1	CO5
10.	Define NP Complete problem. How does NP complete differs from NP Hard?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

- | Q.No. | Questions | Marks | KL | CO |
|--------|--|-------|----|-----|
| 11. a) | Solve the following recurrence relation by master theorem | | | |
| | i. $T(n)=16T(n/4)+n^2$ | 6 | K2 | CO1 |
| | ii. $T(n)=2T(n/2)+ n\log n$ | 7 | | |
| (OR) | | | | |
| b) | Define time complexity of an algorithm and analyze linear search for best case, worst case and average case. Provide an example. | 13 | K3 | CO1 |
| 12. a) | Analyze the binary search for worst case execution with algorithm for the following set of elements 10,20,30,40,50,60,70. | 13 | K3 | CO2 |

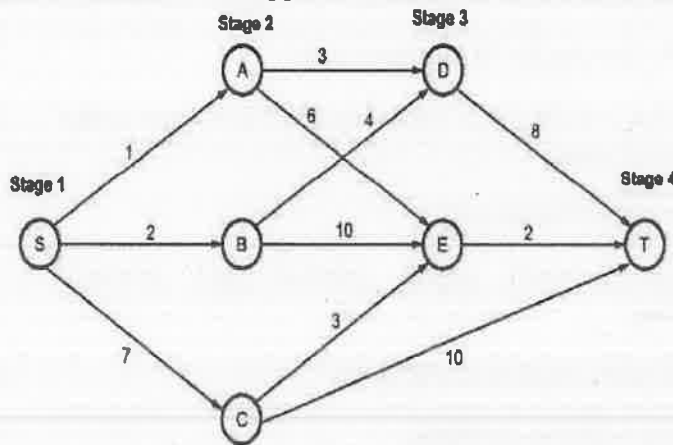
(OR)

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|----|--|----|----|-----|
| b) | Consider that there are three items. Assume $W = 20$ and Weight and Profit value of each item is as given below: | 13 | K3 | CO2 |
|----|--|----|----|-----|

i	Wi	Pi
1	18	30
2	15	21
3	10	18

Using Greedy Method, solve the given knapsack problem.

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|--------|---|----|----|-----|
| 13. a) | Find the minimum cost path of Multi stage Graph using forward approach and backward approach. | 13 | K3 | CO3 |
|--------|---|----|----|-----|



(OR)

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|--------|--|----|----|-----|
| b) | Explain the dynamic programming for Floyd's algorithm execution in detail. Apply Floyd's All pairs shortest path algorithm for a graph and show the working with an example. | 13 | K3 | CO3 |
| 14. a) | Apply backtracking to solve the following instance of the sum of subset problem and draw a portion of state space tree:
$A = \{5, 10, 12, 13, 15, 18\}$ and $d = 30$. | 13 | K3 | CO4 |

