

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)



B. Tech(Fourth Semester – Regular/Supplementary) Examinations, April 2026

23BCSPC24004– Design & Analysis of Algorithms

(CSE, CSE (AIML), CSE (DS))

Time: 3 hrs

Maximum: 60 Marks

Answer ALL questions
(The figures in the right hand margin indicate marks)

PART – A

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Define performance analysis of algorithms.	CO1	K1
b. Explain about spurious hit with one example.	CO4	K2
c. Define dynamic programming and its properties.	CO2	K1
d. What is Minimum Spanning Tree?	CO3	K2
e. What is NP-Hard problem?	CO5	K2

PART – B

(10 x 5=50 Marks)

Answer **ALL** the questions

	Marks	CO #	Blooms Level
2. a. Explain the Binary Search algorithm and analyze its complexity.	5	CO2	K2
b. Solve the recurrence relation using Master theorem method: $T(n) = 3T(n/3) + n$	5	CO1	K3
(OR)			
c. Explain about various types of asymptotic notations with examples..	5	CO1	K2
d. Define LCS. Find the LCS from the given sequences $X=\{A,B,C,B,D,A,B\}$ and $Y=\{B,D,C,A,B,A\}$	5	CO2	K3
3.a. Explain Merge Sort algorithm with example. $\{14,16,10,8,7,9,4,2,5,3\}$	5	CO2	K3
b. Explain all pair shortest path algorithms. Evaluate the time complexity.	5	CO3	K3

(OR)

c. Explain Prim's algorithm and its complexities	5	CO3	K3
d. Difference between D&C, greedy and dynamic programming	5	CO2	K3

4.a. What is Activity Selection Problem? Find the solution for the following set of activities

I	1	2	3	4	5	6	7	8	9	10	11
Si	0	5	12	1	5	2	3	3	8	5	6
Fi	6	6	14	4	9	13	8	5	12	7	10

5 CO3 K3

b. Explain 0/1 Knapsack problem using dynamic programming. **M=5**

| Item | Weight | Profit |

| 1 | 2 | 12 |

| 2 | 1 | 10 |

| 3 | 3 | 20 |

| 4 | 2 | 15 |

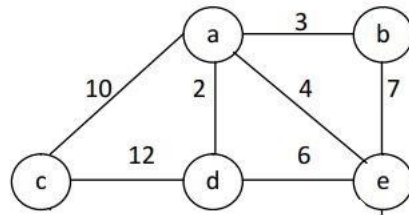
5 CO3 K3

OR

c. Find out optimal sequence for multiplication: $A_1 [5 \times 4]$, $A_2 [4 \times 6]$, $A_3 [6 \times 2]$, 5 CO3 K3

and A4 [2 × 7].

- d. Find the DFS of the following graph by considering **a** as the start node



5 CO3 K3

- 5.a. Explain the 4-Queen problem using backtracking technique with solution state.
 b. Suppose we use string matching problems, consisting of a text T and a string P ,
 is as follows: T = 987562314 P = 56 and q=9 find the position using Rabin Karp
 algorithms.

5 CO4 K3

5 CO4 K3

(OR)

- c. Give the failure function (or prefix function) of the Knuth–Morris– Pratt pattern
 matching algorithm for the pattern P from the pattern matching problem
 d. What is Approximation algorithms and why we need it? Is it polynomial
 computable?
 6.a. Write the Recurrence relation for Quick Sort and solve it
 b. Solve TSP using Branch and Bound.

5 CO4 K3

5 CO5 K2

5 CO2 K3

5 CO5 K3

(OR)

- c. Write down the algorithms for PARTITION procedure. Specify the best case
 and worst case time complexity of quick sort.
 d. Explain Vertex Cover problem and its approximation algorithm.

5 CO2 K2

5 CO5 K2

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