



## Term Evaluation (Even) Semester Examination March 2025

2492001

Roll no.....

Name of the Course and semester: BCA IV Semester

Name of the Paper: Introduction to Design and Analysis of Algorithms

Paper Code: TBC 401

Time: 1.5 hour

Maximum Marks: 50

### Note:

- (i) Answer all the questions by choosing any one of the sub questions
- (ii) Each question carries 10 marks.

Q1. (10 Marks) CO1 CO2

- a. Define Big-O (O), Big-Omega ( $\Omega$ ), and Big-Theta ( $\Theta$ ) notations. How do they differ?

OR

- b. Find the growth function for the given equation with proper explanation:

$$T(n) = 3n^4 + 10n^3 + 6n^2 + 2n + 1$$

Q2. (10 Marks) CO1 CO2

- a. Implement a recursive function to find the greatest common divisor (GCD) of two numbers using Euclid's algorithm.

OR

- a. Write a recursive function with worst case complexity for binary search algorithm with a suitable example.

Q3. (10 Marks) CO1

- a. Compare Merge Sort with Quick Sort in terms of time and space complexity.

OR

- b. Explain the partitioning process in Quick Sort and explain the Big-O complexity of Quick sort algorithms?

Q4. (10 Marks) CO1

- a. Illustrate the time complexity of any algorithm with nested loops? Explain with an example.

OR

- b. How permutation is different from combination prove with suitable example.



**Mid Term (Even) Semester Examination March 2025**

Q5.

(10 Marks) CO1 CO2

- a. Solve Tower of Hanoi for  $n=3$  and write the sequence of moves.

OR

- b. Define the fractional knapsack problem. Solve the following instance using the greedy approach, given that the capacity of the knapsack is 50.

Item	Weight	Value
A	10	60
B	20	100
C	30	120