

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2025

B.Tech-V Semester (BI)

COURSE CODE(CREDITS): 18B11BI511 (03)

MAX. MARKS: 15

COURSE NAME: Design and Analysis of Algorithms

COURSE INSTRUCTOR: Prof. Tiratha Raj Singh

MAX. TIME: 1 Hour

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.

| Q No | Question | CO | Marks |
|------|--|------|-------|
| Q1. | Sort the following array using Insertion Sort and show the step-by-step transformation: [12, 5, 7, 3, 9] | CO-2 | [3] |
| Q2. | Compute the number of steps to determine the running time $T(n)$ of the following algorithm: Algorithm arraySum(B, n) total \leftarrow 0 for i \leftarrow 0 to n - 1 do total \leftarrow total + B[i] { increment counter i } return total | CO-2 | [2] |
| Q3. | Explain deterministic and non-deterministic algorithms with suitable examples. How do they differ in terms of execution and analysis? | CO-1 | [1.5] |
| Q4. | Discuss <i>Big-Omega</i> (Ω), <i>Big-Theta</i> (Θ), and <i>Big -O</i> (O) notations with examples. Which of these notations gives the most reliable description of algorithm performance? | CO-2 | [2] |
| Q5. | What are the fundamental properties of a good algorithm? Explain each property with its importance in problem-solving. | CO-1 | [1.5] |
| Q6. | What are various kinds of operators utilized for algorithms. Give some relevant examples to realize the importance of operators in algorithmic analyses. | CO-1 | [2] |
| Q7. | Write pseudocode to sort the following array [50,20,40,70,30,10,60] using Merge Sort algorithm. | CO-2 | [3] |