

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B.Tech- Backlog (CSE/IT/BT/ECE/CE)

COURSE CODE (CREDITS): 24B11CI211 (3)

MAX. MARKS: 15

COURSE NAME: DATA STRUCTURES AND ALGORITHMS

COURSE INSTRUCTOR: Dr. Aman Sharma

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

(c) Use of calculator is not allowed

Q.No	Question	CO	Marks
Q1	Consider the following code segment: for i = 1 to n: for j = 1 to i: print(i, j) Determine the exact number of times the print statement executes as a function of n, and give the tight Big-O time complexity. Show all steps.	CO-2	3
Q2	The sorted array below has 15 elements (index 1 to 15): [2, 5, 8, 12, 16, 23, 38, 45, 56, 72, 91, 105, 118, 132, 150] Trace the Binary Search algorithm to search for the key = 91. Show the values of low, high and mid at each step, and state the total number of comparisons made.	CO-3	3
Q3	Convert the infix expression $(A + B) * (C - D) / E$ to its postfix form using the stack-based conversion algorithm. Show the contents of the stack and the output string after each token is processed.	CO-4	3
Q4	A circular queue of capacity 5 (index 0 to 4) uses a count variable to distinguish the full and empty states. Starting from an empty queue, the following operations are performed in order: enQueue(10), enQueue(20), enQueue(30), deQueue(), enQueue(40), enQueue(50), enQueue(60). Show the values of front, rear and the array contents after each operation, and state whether the final enQueue succeeds or causes an overflow.	CO-4	3
Q5	A singly linked list currently stores the values $10 \rightarrow 20 \rightarrow 30 \rightarrow 40$ (head points to 10). Write the sequence of pointer operations to: (a) insert a new node with value 25 immediately after the node containing 20, and (b) delete the node containing 40. Give the final list after both operations.	CO-4	3