JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-1 EXAMINATION- 2026

M.Tech-I Semester (DS)

COURSE CODE (CREDITS): 22M11CI111 (3) MAX. MARKS: 15

COURSE NAME: Advanced Data Structures

COURSE INSTRUCTORS: Ekta Gandotra 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) Calculator is allowed.

JUIT TEST-1 EXAMINATION- AUG-2026

Q. No.	Question	CO	Marks
Q1.	A two-dimensional array $A[0\ldots7][0\ldots11]$ contains 8 rows and 12 columns. Each element occupies 4 bytes. The address of $A[3][5]$ is 5000, and the address of $A[5][3]$ is 5088. Determine whether the array is stored in row-major order or column-major order.	1	[4]
Q2.	Consider two linked-list implementations, each maintaining both a head pointer and a tail pointer: • List S: Singly linked list • List D: Doubly linked list For each of the following operations, determine the worst-case time complexity for both List S and List D. Provide a short justification (1-2 lines) for each answer.	1	[4]

Operation	Singly Linked List (S)	Doubly Linked List (D)
Delete from beginning		
Delete from end		
Search for a given key		
Delete a given node when its pointer is already available		

Q3.	A Binary Search Tree is created dynamically by inserting new nodes at runtime. a. Identify the region of the process memory layout where the newly created BST nodes are generally stored. b. What happens when the system cannot allocate memory for a newly created BST node? Explain how this situation can be detected and handled.	2	[1.5] [1.5]
Q4.	Insert the keys 9, 27, 50, 15, 2, 21, and 36 in this order into an initially empty AVL tree. a. Show the AVL tree after each insertion and indicate any rotations performed. b. Perform Delete (2) on the final AVL tree. Show the tree after the deletion and perform any required rotations.	2	[3] [1]

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