JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

M.Tech.-I Semester (CSE-IS)

COURSE CODE (CREDITS): 10M11CI111 (3) MAX. MARKS: 25

COURSE NAME: Advanced Data Structures

COURSE INSTRUCTORS: Ekta Gandotra MAX. TIME: 1 Hour 30 Minutes

Note: *(a)All questions are compulsory.*
(b)Marks are indicated against each question in square brackets.
(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.

Q.No.	Question	CO	Marks
Q1.	Apply cuckoo hashing technique using the dataset {15, 25, 30, 42, 56, 78, 100} and the hash functions $h1(key) = key \ mod \ 13$ and $h2(key) = \lfloor \frac{key}{13} \rfloor \ mod \ 13$. Illustrate the steps involved and show the final state of the hash table. Also discuss the benefits and drawbacks of this approach.	CO5	[5]
Q2.	a. Construct the red-black trees after successively inserting the keys 41, 38, 31, 12, 19, 8 into and initially empty red-black tree. Also discuss time-complexity of inserting an element in the red-black tree. b. Identify the step-wise actions that should be performed if the sibling of the double-black node is red while deleting an element from the red-black tree. Justify your answer with the help of an example.	CO4	[4] [3]
Q3.	Design a method to find the postorder traversal from a preorder traversal of a binary search tree. Use the given traversal 15, 10, 12, 11, 20, 18, 16, 19 to demonstrate your approach.	CO3	[4]
Q4.	Insert the following integer keys into an initially empty AVL tree in the order 9, 27, 50, 15, 2, 21, and 36. After each insertion, clearly show the resulting AVL tree, and apply any necessary rotations to maintain its balance. Next, delete the key 2 from the final tree, and rebalance it if required.	CO3	[5]
Q5	For a given binary tree of height h, compute the following and provide the justification for your answer: a. Maximum number of leaves b. Minimum number of leaves c. Maximum number of nodes d. Minimum number of nodes	CO2	[4]