

TEST -3 EXAMINATION - 2025

B.Tech-II Semester (CSE/IT/ECE/CE/BT/BI)

COURSE CODE (CREDITS): 24B11CI211 (03)

MAX. MARKS: 35

COURSE NAME: Data Structures and Algorithms

MAX. TIME: 2 Hrs

COURSE INSTRUCTORS: Dr. (Amit, Ravindra, Amol, Kushal) Mr. (Faisal, Gaurav), Ms. Palak

**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	Suppose a given linked list with the elements (1, 4, 6, 3, 9, 8, 5) is not required then create a scenario and write the procedure to dispose the entire list into the pool of the free storage by printing the elements in the reverse order.	1	3
Q2	A binary tree is given which is represented using a single array. Insert the list of nodes into a linked structure. Write the procedure. Also show the same with an example.	3	3
Q3	a) Is Merge sort is stable? Defend your answer and write best and worst case complexity. b) Is Quick sort is stable? Defend your answer and write best and worst case complexity. c) Draw the recursive tree with the following list of elements with Quick sort; 55, 88, 22, 99, 44, 11, 66, 77, 33	3	1 1 3
Q4	Consider the following set of keys: 15, 11, 25, 16, 9, 8, 12 and the hash function $H(k) = (k \bmod 7) + 1$ is used to allocate keys in the hash table. The collision is handled with closed hashing: Linear Probing. Find out how many comparisons required getting the key 8 from the hash table.	3	5
Q5	a) Equation to get the maximum number of nodes possible in B tree of order m and height h. b) Write down the properties of a B tree of order m. c) Insert the following keys in the B tree one by one: 10, 20, 30, 40, 50, 60, 70, 80, 90.	5	1 1 4
Q6	a) Represent the given Konigsberg's bridges (right side) in the graph representation. The small letters represents the bridges (edge) and the capital letters represent the land area (nodes). Is the generated graph a simple or parallel graph? Why? b) Represent any graph as given here using Adjacency Matrix and List.	6	2 2+3
Q7	Consider the given graph. Traverse it systematically by visiting all the vertices exactly once by starting from vertex $v_1$ . Show the traversal sequence of DFS and BFS. Consider the smaller indexed vertex first for the Enqueue or Push.	6	3+3

