

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

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

COURSE CODE (CREDITS): 25B11CI318 (3)

MAX. MARKS: 15

COURSE NAME: Data Structures

COURSE INSTRUCTOR:KLK,

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   | (a) Differentiate in Linear and Non-Linear data structures.<br>(b) Given an empty stack and an empty queue, following operations are performed: push(10), push(20), push(30), pop(), enqueue(pop()), push(50), enqueue(pop()). Find the sum of elements in the queue.<br>(c) Match the following in a Table. add_at_beg(), delete_from_beg(), add_at_end(), delete_from_end() to push(), pop(), enqueue(), dequeue(). | 1  | 1+1+1 = 3 |
| Q2   | Write pseudocode for binary search and interpolation search. Give space and time complexity expressions of each. Show the execution of both algorithms on the following data: 10,20,30,40,50,60,70,80,90,100 and the item to be searched is 70.                                                                                                                                                                       | 2  | 2+2 = 4   |
| Q3   | Give the definition of big-Oh notation. Show that $O(f+g)=O(\max(f,g))$ , given that f and g are monomials of n.                                                                                                                                                                                                                                                                                                      | 2  | 2         |
| Q4   | (a) Give advantages of Hashing over indexed based storage techniques.<br>(b) A hash table of size 10, indexed from 0 to 9, uses the hash function $h(k)=k \bmod 10$ . The collisions are resolved using linear probing. Insert the keys in the following order: 23, 43, 13, 27, 37, 18, 28.<br>(c) Give the definition of load factor and compute it for the table mentioned in (b) above.                            | 3  | 1+2+1=4   |
| Q5   | Give the space and time complexity expression of Quick Sort. Do first pass of Quick Sort on the following data by choosing the last element as pivot: 2, 8, 7, 1, 3, 5, 6, 4.                                                                                                                                                                                                                                         | 1  | 1+1=2     |