

**ASSIGNMENT QUESTION 2024-25**

**B.Sc. (IT) Part – III**

**BIT-302**

**DATA STRUCTURE**

**Time : 3 Hrs**

**Min.Marks :17**

**Max.Marks : 50**

**Note : Section 'A', containing 10 very short-answer-type questions, is compulsory. Section 'B' consists of short answer type questions and Section 'C' consists of long answer type questions. Section 'A' has to be solved first.  
Section - 'A'**

**Answer the following very short-answer-type questions in one or two sentences  
1x10=10:**

1. Define data structure.
2. What is Algorithm?
3. What is a header node in a linked list?
4. How does a linked list differ from an array?
5. What is Height Balance Tree?
6. Define tree traversal.
7. What is the complexity of Bubble Sorting?
8. Define sequential search.
9. What is a hash table?
10. Define a weighted graph.

**Section - 'B'**

**Answer the following short-answer-type questions with word limit 150-200**

**(3× 5=1)**

- Q.1 Describe the enqueue and dequeue operations in a queue.  
**OR**
- Q.2 Discuss the applications of stack in recursion and postfix evaluation.
- Q.3 Explain Overflow and Underflow condition of queue.  
Or  
Explain the linked list implementation of a queue.
- Q. 3 Explain preorder and postorder tree traversal with an example.  
**OR**
- How are binary trees represented using arrays?
- Q4. Describe Binary Search and highlight its advantages over Sequential Search.  
**OR**
- Compare quick sort and heap sort based on time complexity and performance.
- Q.5 Describe collision resolution techniques in hash tables.  
**OR**

Explain Prim's algorithm for finding the minimum spanning tree.

**Section - 'C'**

**Answer the following long-answer-type questions with word limit 300-350**

**(5x5=25)**

- Q.1 Discuss the role of stacks in infix to postfix conversion with an example.  
**OR**  
Explain in detail the operations of circular queues and their applications.
- Q. 2 What is Doubly Linked List? Explain.  
**OR**  
Describe the implementation of stacks using linked lists.
- Q. 3 Discuss the advantages of threaded binary trees.  
**OR**  
Explain the 2-3 Tree algorithm with suitable example.
- Q.4 Describe the binary search algorithm and its time complexity.  
**OR**  
Explain the quick sort algorithm. What is the complexity of the algorithm?
- Q. 5 Explain the depth-first search (DFS) and breadth-first search (BFS) algorithms in graphs.  
**OR**  
Discuss Kruskal's algorithm for computing the minimum spanning tree with an example.