Bankura University

B.Sc(Honours) THIRD SEMESTER EXAMINATIONS, 2021-22

Subject: Computer Science **Course ID: 31511**

Course Title: Data Structure

Full Marks: 25 **Time: 1 Hr 15 Min**

The figures in the margin indicate full marks

Answer all the questions

UNIT I

1. **Answer any five of the following questions:** (1×5= 5)
   a. Why data structures are used?
   b. What do you mean by stack underflow?
   c. State one limitation of linear array based queue.
   d. Draw the block diagram of a doubly linked list.
   e. Define tree as a graph.
   f. Name a searching algorithm that never acquires O(n) time complexity.
   g. Name an in-place sorting algorithm.
   h. Why hashing is used?

UNIT II

2. **Answer any two of the following questions:** (2×5 = 10)
   a. What is sparse matrix? Write an algorithm to express sparse matrix in compressed form
   b. Describe various operations on a circular array based queue.
   c. Show all binary trees and binary search trees which can be constructed with the nodes a, b, c where a < b < c
   d. Write a short note on hashing

UNIT III

3. **Answer any one of the following questions:** (1×10 = 10)

a. Write down the insertion sort algorithm and apply it on the set {3,1,7,6,4}

b. For a linear linked list write the algorithm for:
   i. Inserting a node containing a specific data
   j. Removing a node containing a specific data