**SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR**

**ROLL No:** | | | | | | | | | | | | **Total number of pages:[ ]**
**Total number of questions:06**

**B.Tech. || CSE || 3rd Sem** / ECE 5th Sem.

# Data Structure

2011 Batch onwards

**Subject Code:BTCS-304A** / 304

**Paper ID:** (for office use)

Reappear

**Time allowed: 3 Hrs** **Max Marks: 60**

**Important Instructions:**

- **All questions are compulsory**
- **Assume any missing data**

## PART A (2×10)

Q. 1. Short-Answer Questions: All COs

(a) State any two applications of Graphs.
(b) Define stacks and queues with an example.
(c) Which data structure is used to perform recursion and Why?
(d) Define garbage collection.
(e) What do you mean by overflow and underflow?
(f) What is Time and Space complexity of an algorithm?
(g) How would you represent a linear array in the memory?
(h) Compare and contrast Arrays and Linked list.
(i) Define Queue with a real-life example.
(j) Explain properties of Binary Search Tree with the help of an example.

## PART B (8×5)

Q. 2. What are priority queues? Explain how these queues are represented by using arrays. COa

OR

How would you represent 2D array in memory also give an example in order to find the address of any element. COa

Q. 3. Explain complexity of an algorithm? What do you understand by best, average and worst case complexity of an algorithm? COb

OR

What is linear search algorithm. Calculate complexity of linear search. COb

Q. 4. Explain Warshall's algorithm and its variation. COc

OR

What is difference between Binary tree and ordinary tree. Explain with neat diagrams. Write an algorithm to evaluate a postfix expression. COc

Q. 5. Define Heap. Explain its properties with example. Why is heap preferred to be implemented through arrays? COd

OR

What is AVL Tree. Draw AVL tree with following elements:
64,1,14,26,13,110,98,85

Q 6. Given a list of values stored in one dimensional array : 23,1,3,10,57,29,21
Sort the list using Bubble Sort technique and also mention the algorithm. COe

OR

Explain Quick Sort by taking an example. Also write an algorithm for quick sort. COe