

23/3101**B.C.A. (Third Semester) Examination, 2023****Second Paper****(Data Structure Using C & C++)***Time : 3:00 Hours / [Maximum Marks : 75*

Note : Attempt any **five** questions. **All** questions carry equal marks.

1. (i) Why are arrays known as static data structures? 5+5+5
- (ii) What are the applications of sparse arrays in theoretical computer science?
- (iii) Write the vector Representation for Lower triangular matrix and illustrate with an example.

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2. (a) Write the algorithm for evaluation of postfix expression using a stack. 7+8
- (b) Write the method of interconversion between Infix, prefix and postfix expressions using stack. Give examples.
3. Write a short note on: 5+5+5
 - (i) Queue and its applications
 - (ii) Deque or D-queue
 - (iii) Priority queue
4. (i) How are sequential and linked lists represented in memory? 5+5+5
- (ii) Show the process of insertion, deletion and counting of nodes in a singly linked list in memory.
- (iii) Show how doubly linked lists can be represented and traversed in memory.

5. Write a short note on: **23/3101**
5+5+5
- (i) Binary tree
 - (ii) B-Tree
 - (iii) Binary Search Tree
6. Write the algorithm for insertion sort and trace it with a random selection of a list consisting of 10 integers. 15
7. Explain with example data set: $7\frac{1}{2} \times 2$
- (i) Merge Sort
 - (ii) Heap sort
8. (i) Differentiate between linear search and binary search with an example. 8+7
- (ii) What are the 'Collision' problems that occur in hashing? How can this be resolved?