# School of Computing Science and Engineering

**Bachelor of Computer Applications**
**Semester End Examination - Jun 2024**

**Duration : 180 Minutes**
**Max Marks : 100**

## Sem II - E1UA201B- B070203T - Data Structures

*General Instructions*
*Answer to the specific question asked*
*Draw neat, labelled diagrams wherever necessary*
*Approved data hand books are allowed subject to verification by the Invigilator*

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| **1)** | Differenciate between AVL tree and Binary Search tree | K1(2) |
| **2)** | Write the Algorithm for the Insertion Sort. | K2(4) |
| **3)** | What is doubly linked list. Write the declaration of doubly linked list in C. | K2(6) |
| **4)** | Explain the insertion sort algorithm in detail, covering its key steps, time complexity analysis, best-case scenario, worst-case scenario, average-case scenario, and discussing its advantages and disadvantages compared to other sorting algorithms. | K3(9) |
| **5)** | What do you mean by Queue? Explain the working of a Linear Queue. Write down its limitations. How do you implement the Queues in memory by using array. | K3(9) |
| **6)** | a) Differentitate Between Circular Queue and double Ended Queue. B) Explain and Write the underflow and overflow conditions in Circular Queue. | K5(10) |
| **7)** | Write the Algorithms for the Insertion of the elements in the Singly linked list for the following three cases: a) Insertion at the beginning b) Insertion at any position c) Insertion at the end | K4(12) |
| **8)** | a) Write the Algorithm for reversing the Double-Ended Linked List. B) Evaluate the time complexity for reversing the Double-Ended Linked List. | K5(15) |
| **9)** | Answer the following: a)Design an algorithm to generate first ten Fibonacci numbers recursively. B)Write the C Program for implemeting the Factorial. | K5(15) |
| **10)** | Explain the following: a) Explain the different types of linked list with diagram. b) Write C program to implement the insert and delete operation on a queue using linked list? Write All the Cases of insertion and Deletion. | K6(18) |