

**BACHELOR OF SCIENCE (COMPUTER SCIENCE) (CBCS - 2018 COURSE)**  
**S.Y.B.Sc.(Computer Science) Sem-IV :SUMMER- 2022**  
**SUBJECT : DATA STRUCTURES USING C++**

Day : Friday  
Date : 1/7/2022

**S-20103-2022**

Time : 03:00 PM-06:00 PM  
Max. Marks : 60

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.

**Q.1** Answer **ANY TWO** of the following: [12]

- a) What is Queue? Explain queue as an ADT.
- b) Write a C++ program to implement linear linked list for adding a new node in the middle.
- c) Differentiate between static and dynamic memory allocation methods.

**Q.2** Answer **ANY TWO** of the following: [12]

- a) What is meant by threaded binary tree? Also explain weighted binary tree.
- b) Describe DFS algorithm with the help of suitable example.
- c) Write a note on indexed sequential search and random search.

**Q.3** Answer **ANY TWO** of the following: [12]

- a) Write a C++ program to traverse the tree in pre-order and post-order.
- b) Write a C++ program to implement selection sort technique.
- c) Differentiate between Array and Linked list.

**Q.4** Answer **ANY THREE** of the following: [12]

- a) Define the terms- forest, siblings and complete binary tree.
- b) Describe memory representation of Array with example.
- c) Convert the following to prefix and postfix:
  - i)  $a + b * c$
  - ii)  $p - q / s$
  - iii)  $x * y + z - s$
  - iv)  $l + m * n - p$
- d) Differentiate between stack and queue.

**Q.5** Answer **ANY FOUR** of the following: [12]

- a) Define Graph. Explain connected graph.
- b) What is expression tree? Explain.
- c) List applications of Tree.
- d) Define - time and space complexity.
- e) What is spanning tree?
- f) Define- Data Object and Data Structure.

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