



# CBCS SCHEME

USN

|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|

18EC643

## Sixth Semester B.E. Degree Examination, June/July 2024 Data Structures using C++

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Explain recursion. Write a recursive function in C++ to find the factorial of a number. (10 Marks)
- b. Discuss Template functions in C++. Write template function to swap two parameters with arguments being two integers or two float values. (10 Marks)

OR

- 2 a. Explain inheritance. Explain different types of Inheritance. (10 Marks)
- b. Explain polymorphism. Explain different types of polymorphism. (10 Marks)

### Module-2

- 3 a. Explain how new and delete operators are used for dynamic memory allocation. (05 Marks)
- b. Discuss the need for row and column mapping. Explain with example. (05 Marks)
- c. What are special matrices? Explain with example. (10 Marks)

OR

- 4 a. Write a C++ program to add 2 matrices. (10 Marks)
- b. What do you mean by linked lists? Explain the concept of insertion and deletion of nodes of linked lists using C++. (10 Marks)

### Module-3

- 5 a. Explain how parenthesis matching is carried out using stack. Write C++ function for the same. (12 Marks)
- b. Write C++ abstract class for stack. (08 Marks)

OR

- 6 a. Develop a C++ template class to implement stack in linked representation. Define member functions for push and pop operation. (10 Marks)
- b. Describe Towers of Hanoi problem and give the solution for the same. (10 Marks)

### Module-4

- 7 a. Write a method for push and pop for linked queue. (10 Marks)
- b. What is dictionary? Discuss various operations on dictionaries. (10 Marks)

OR

- 8 a. Write short notes on hashing. (10 Marks)
- b. Discuss problem description and solution strategy for rail road car management. (10 Marks)

### Module-5

- 9 a. Write functions for preorder traversal of binary tree and in order traversal of binary tree. (10 Marks)
- b. Write a function to search for an element in binary search tree. (10 Marks)

OR

- 10 a. Write a C++ function to delete elements from max heaps. (10 Marks)
- b. Briefly describe array based and linked representation of a binary tree with examples. Write a C++ member function height linked binary tree class to determine height of binary tree. (10 Marks)

\*\*\*\*\*

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.