CBCS SCHEME

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18EC643

Sixth Semester B.E. Degree Examination, June/July 2025
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. Define C++ and explain its features. **(06 Marks)**

b. With example, explain the different expressions used in C++. **(07 Marks)**

c. What is constructor? Discuss the different types of constructors with example. **(07 Marks)**

OR

2 a. Explain operator overloading with C++ program. **(08 Marks)**

b. Explain the different types of Inheritance. **(06 Marks)**

c. Explain Recursion. Write a recursive function in C++ to find the factorial of a number. **(06 Marks)**

Module-2

3 a. Define sparse matrix and also explain the representation of sparse matrix using single linear. **(08 Marks)**

b. Write the abstract class linear list. **(06 Marks)**

c. Write a program in C++ to perform create, display operation on single linked list. **(06 Marks)**

OR

4 a. What is a linear list? write the abstract class of linked list. **(06 Marks)**

b. How dynamic memory allocation is performed in C++? Explain with suitable example. **(08 Marks)**

c. Write struct definition for chain node. **(06 Marks)**

Module-3

5 a. Write C++ abstract class for stack. **(06 Marks)**

b. Using stack change the following infix to postfix expressions:
$(A+B)*(C-D)*(F+C)$ **(06 Marks)**

c. Explain the concept of towers of Hanoi problem using stack. **(08 Marks)**

OR

6 a. Explain how paranthesis matching is carried out using C++. Write C++ program (function) for the same. **(10 Marks)**

b. Explain the evaluation of postfix expression using stack with example. **(10 Marks)**

Module-4

7 a. Write ADT specification of a Queue. **(06 Marks)**

b. What is Hashing? Explain hashing function and tables. **(06 Marks)**

c. Write ADT specification and abstract class for dictionary. **(08 Marks)**

OR

8 a. Discuss the problem description and solution strategy for rail road car management. **(10 Marks)**

b. Explain the various operations to be performed on dictionaries with examples. **(10 Marks)**

Module-5

9 a. What is Binary Tree? Explain the properties of binary trees in detail. **(10 Marks)**

b. Write a binary tree for the algebraic expression :

$$\left[a+(b-c)*\left[(d-e)/(f+g-h)\right]\right]$$ **(06 Marks)**

c. Explain binary search tree with simple example. **(04 Marks)**

OR

10 a. Explain the various traversal methods of binary tree. **(06 Marks)**

b. Write a C++ function to determine the height of the tree. **(06 Marks)**

c. What is max heap? Write a program to initialize a max heap. **(08 Marks)**

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