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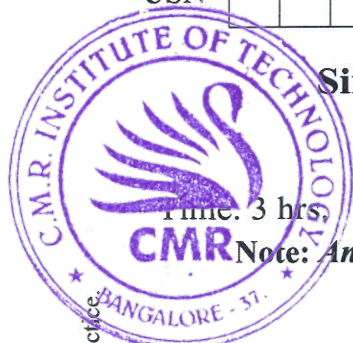
18EC643

Sixth Semester B.E. Degree Examination, Jan./Feb. 2023
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. Discuss the features of C++. **(06 Marks)**
   b. What is constructor? Discuss the different types of constructors with example. **(08 Marks)**
   c. Define recursion. Write the recursion function in C++ to find the factorial of a number. **(06 Marks)**

OR

2 a. What is inheritance? Explain the different types of inheritance with an example. **(10 Marks)**
   b. Discuss the template function in C++. Write template function to swap two parameters with arguments being two integers or two float values. **(10 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. Explain vector representation with an example. **(06 Marks)**

OR

4 a. How dynamic memory allocation is performed in C++? Explain with suitable example. **(08 Marks)**
   b. Write a C++ program to add two matrices. **(06 Marks)**
   c. Write struct definition for chain node. **(06 Marks)**

Module-3

5 a. Write C++ abstract class for stack. **(06 Marks)**
   b. Write the abstract data type stack. **(06 Marks)**
   c. Write a program to explain the concept of towers of Hanoi problem using recursive method. **(08 Marks)**

OR

6 a. Explain how parenthesis matching is carried out using stack. Write C++ function for the same. **(10 Marks)**
   b. Explain the evaluation of postfix expression using stack with example. **(10 Marks)**

Module-4

7 a. Write the abstract data type for queue. **(04 Marks)**
  b. Write C++ template to double the length of the array queue. **(08 Marks)**
  c. Write ADT specification and abstract class for dictionary. **(08 Marks)**

OR

8 a. Discuss problem description and solution strategy for rail road car arrangement. **(10 Marks)**
  b. Write C++ template for push and POP methods of linked queue. **(10 Marks)**

Module-5

9 a. Define a binary tree. State and prove any four properties of binary tree.
  b. Write functions for
      i) Pre-order traversal of binary tree **(10 Marks)**
      ii) Determining height of the binary tree. **(10 Marks)**

OR

10 a. Write a function to insert an element into a binary search tree. **(08 Marks)**
   b. Write ADT specification of binary tree. **(06 Marks)**
   c. Write a short note on heap sort. **(06 Marks)**

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