(Please write your Exam Roll No.) Exam Roll No. 066

END TERM EXAMINATION

THIRD SEMESTER [B.TECH] DECEMBER 2024-JANUARY 2025

Paper Code: CIC-211 Subject: Object-Oriented Programming Using C++

Time: 3 Hours Maximum Marks: 60

Note: Attempt five questions in all including Q. No.1 which is compulsory. Select one question from each unit.

Q1 Attempt any five, from the following questions:- (5x4=20)

(a) Explain the concept of return by reference

(b) Data Abstraction vs Encapsulation.

(c) Write properties of static member functions. How to call it? Give suitable example.

(d) "Namespaces in C++ are used for organizing and avoiding naming conflicts in a program", Justify whether the given statement is **True or False**, using proper example.

(e) Why we use generic classes in C++? Give example.

(f) Runtime vs Compile Time polymorphism

UNIT-I

Q2 (a) Develop a C++ program to represent a complex number using a class. Create a **Complex** class with private real and imaginary parts. Implement a **friend function** named **add**, that takes two **Complex** objects as parameters and returns a new **Complex** object representing the sum of the two complex numbers. (5)

(b) Explain the concept of function overloading with suitable example. (5)

OR

Q3 (a) Differentiate between: (2x3=6)

(i) Implicit and explicit type conversion

(ii) Call by Value and Call by Reference

(b) Explain the concept of inline function. Where it should not be used? Develop a program to calculate the factorial of a number using an inline function. (4)

UNIT-II

Q4 (a) What is an array of objects? How it is stored inside memory? Develop a programin C++ to manage student database for 'n' number of students, using an array of student objects. Each student should have attributes like name, id,and marks. Implement functionalities to input and display students' details. (6)

(b) Discuss the use of a constructor in C++. What are its various types? Write a program using different types of constructors in C++. Can constructors be inherited in derived class? (4)

OR

Q4 (a) Write short note on the following with example: (4)

(i) Use of destructor and its order of calling

(ii) Dynamic memory allocation in C++

(b) Define operator overloading. Which operators in C++ cannot be overloaded? Implement a C++ class representing time (hours, minutes, seconds). Overload the + operator to enable the addition of two-time instances. (6)

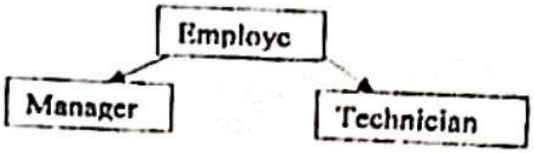
P-1/2-

P.T.O.

UNIT-III

Q6 (a) Define pure virtual functions and abstract classes. What are their properties? Provide an example illustrating their use. (5)

(b) Design a program in C++ to represent an employee hierarchy using inheritance. Create a base class Employee with attributes like name, ID, and salary. Derive classes for different types of employees, such as Manager and Technician, each with specific attributes. Include functions to display details of each employee type. (5)



OR

Q7 (a) Write short note on the following: (with example) (5)

(i) Function overriding

(ii) Aggregation vs Composition

(b) What is generic programming? Design a generic C++ template function that swaps the values of two variables. Write a program that uses this template function to swap integers, doubles, and characters. Ensure that your template function works for various data types. (5)

UNIT-IV

Q8 (a) Write a C++ program to copy one file to another after converting upper case character to lower case characters. (4)

(b) Distinguish between the following: (4x1.5=6)

(i) List and vectors

(ii) Queue and deque

(iii) Arrays and vectors

(iv) Sets and maps

OR

Q9 (a) Write short note on any two of the following: (2x3=6)

(i) Persistent objects

(ii) Exception handling in C++

(iii) Vectors

(b) What is a standard template library (STL)? What are its various components? Discuss the purpose of iterators in C++ STL? Explain the concept to initialize vector iterators using the begin() and end() functions. (4)

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