Exam.Code:0906
Sub. Code: 33299

2055
B.E. (Computer Science and Engineering)
Second Semester
CSC-201: Object Oriented Programming

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section.

x-x-x

Q1. a) What is the purpose of a constructor in a class.

b) Explain the use of friend function with help of suitable example.

c) Why is the order of constructor and destructor execution important in managing object state?

d) How do templates in C++ relate to the concept of code reusability and generic programming?

e) In what situations might you choose to use a custom exception class instead of a standard exception. 5x2

Section-A

Q2. a) Create a base class Vehicle with integer members num Wheels and speed. Create a derived class Car that inherits from Vehicle and adds a boolean member has Sunroof. 7

Write a program that creates a Car object, sets values for all the member variables (including those inherited from Vehicle), and prints the values.

b) Differentiate between class members and structure members. Can functions be members of structures? 3

Q3. Create a class ComplexNumber to represent complex numbers (real and imaginary parts). Implement member functions to set the real and imaginary parts. Overload the + operator to add two ComplexNumber objects. Create a friend function multiplyComplex that takes two ComplexNumber objects as arguments and returns their product (another ComplexNumber object). 10

Write a program to demonstrate the use of the overloaded + operator and the friend function multiplyComplex. Explain why a friend function might be necessary in this scenario and how it differs from a member function.

Q4. a) Each book in a library has a title, author, ISBN, and publication year. Create a class Book with the specified members and an array of Book objects. Implement a function to sort the array of books by publication year using a custom comparison function. 7

b) Differentiate between private functions and static functions. 3

Section-B

Q5. a) Design a class hierarchy for different types of vehicles (e.g., Car, Truck, Motorcycle). Each vehicle should have a virtual function displayDetails() that prints specific information about the vehicle. Demonstrate polymorphism by creating an array of Vehicle pointers, each pointing to a different type of vehicle, and then calling displayDetails() for each element in the array. 7

b) What happens if you don't override a virtual function in a derived class? 3

P.T.O.

Q6. a) Explain the try, catch, and throw keywords. Give a simple example of how they are used together. 5

b) Write a program that reads a text file and counts the number of words in it. You can assume that words are separated by spaces or newline characters. 5

Q7. a) Implement a class template called MyArray that can store an array of any data type. Include basic functionalities like adding elements, accessing elements, and getting the size. 5

b) Write a program that encrypts a file by adding 1 to the ASCII value of each byte and saves the encrypted data to a new file. Write a corresponding decryption program. 5

x-x-x