Graphic Era HILL UNIVERSITY

End Term (Odd) Semester Examination November 2025

Roll no.....

Name of the Course and semester: B.Tech. 3rd sem
Name of the Paper: OOP with C++
Paper Code: TCS 307
Time: 3 hour Maximum Marks: 100

Note:

(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1. (2X10=20 Marks)

a. Construct a C++ program to create a class called Test with following members:

Data Members:

string str

Member Function:

Void inputVal(string) : This member function will store value into str.
void showVal() : This member function will print value of str
void checkVal() :This member function will check whether first and second last character of str string is equal or not.

In main function create object of class Test and perform the above task. CO1

b. Compare and contrast Procedural, Structured, and Object-Oriented Programming paradigms. Highlight core features, typical use cases, and program design differences with suitable C++ examples where applicable CO1

c. Implement a C++ program to input an array of n integers and: CO1

- Find the maximum element
- Find the minimum element
- Display the difference between maximum and minimum element.

Q2. (2X10=20 Marks)

a. With respect to C++ justify the statement "Friendship is granted not taken" in your own words with proper examples. CO2

b. Differentiate between deep copy and shallow copy with the help of proper C++ code? Implement a C++ program to return an object using this pointer only. CO2

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c. Implement by creating a class called Distance that has two integer data members: feet and inches. CO2

Implement the following in the class:
A member function to read the values of feet and inches from the user.
A member function to add two Distance objects and return the resulting distance.
A member function to display the distance in the format: "X feet Y inches"
Ensure that if inches exceed 12, it is automatically converted into feet appropriately.
Design a C++ program to create two Distance objects, add them, and display the result.

Q3. (2X10=20 Marks)

a. Discuss Diamond Problem in inheritance with the help of proper C++ code. What is the proper solution to Diamond Problem? Explain with proper C++ Program CO3

b. Implement a C++ program to Overload stream extraction >> and stream insertion << operator. CO3

c. With the help of C++ program, implement Post increment operator overloading of unary ++ using friend function only CO3

Q4. (2X10=20 Marks)

a. Discuss ambiguity in multiple inheritance? How is it resolved? Explain with the help of a C++ program how to resolve diamond problem in inheritance?
CO4

b. Assume a file source .txt contains some string " hello C++ program".

i. Read the contents of this file and display it on the console
ii. Write your own content to the same file source.txt, such that the old data that is present in the file should persists (no over writing) CO4

c. Imagine a tollbooth with a class called TollBooth. The two data items are of type unsigned int and double to hold the total number of cars and total amount of money collected. A constructor initializes both of these data members to 0. A member function called payingCar( )increments the car total and adds 50 to the cash total. Another function called nonPayCar( ) increments the car total but adds nothing to the cash total. Finally a member function called display( ) shows the two totals. Include a program to test this class. This program should allow the user to push one key to count a paying car and another to count a non paying car. Pushing the ESCAPE key should cause the program to print out the total number of cars and total cash and then exit CO4

Q5. (2X10=20 Marks)

a. What is the necessity of creating an abstract class in C++? Design a C++ code to justify how virtual function or pure virtual function preserves the property of method overriding in c++. CO5

b. Explain Exception in C++? How it is handled in C++.Implement a C++ program that demonstrates the concept of custom exception.
CO5

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c. Illustrate the class hierarchy of C++ stream classes with a well-labeled diagram that shows the relationship among different stream classes. Briefly explain the role of each of these classes in handling console and file input/output operations.
Emphasize the need of STL in modern software development, particularly in reducing development time and avoiding low-level memory management issues with proper justification. CO