Graphic Era HILL UNIVERSITY
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End Term (Odd) Semester Examination November 2025

Roll no.....

Name of the Course and semester: Diploma (CS) 3rd
Name of the Paper: Object Oriented Programming
Paper Code: DTCS 301

Time: 3 hours 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. Explain the concept and evolution of Object-Oriented Programming. Discuss its need and how it differs from procedure-oriented programming. (CO1)

b. Describe the main features of Object-Oriented Programming such as abstraction, encapsulation, inheritance, and polymorphism. Support your answer with suitable examples. (CO1)

c. Write and explain the basic structure of a C++ program. Describe the purpose of #include, namespace, main() function, and use of cout and cin. (CO1)

Q2. (2X10=20 Marks)

a. Define a class and object in C++. Explain their syntax and memory allocation mechanism. Write a C++ program demonstrating the use of constructors (default, parameterized, copy) and destructors in object creation and destruction. (CO2)

b. Explain different types of constructors in C++ — default, parameterized, copy, and overloaded constructors. Also describe the role of destructors. (CO2)

c. What are static data members and static member functions? Discuss their features, memory allocation, and usage with a suitable example. (CO2)

Q3. (2X10=20 Marks)

a. Explain function overloading and operator overloading in C++. How do they help in achieving polymorphism? Write an example of function overloading. (CO3)

b. Define inheritance. Explain various types of inheritance (single, multiple, multilevel, hierarchical, hybrid) with suitable examples or diagrams. (CO3)

c. Discuss the concepts of virtual base classes and abstract classes. Why are they important in inheritance? Explain with an example. (CO3)

Q4. (2X10=20 Marks)

a. What are pointers? Explain their declaration, initialization, and pointer arithmetic. Write an example to show how pointers can be used to access data members of a class. (CO4)

b. Differentiate between call by value and call by reference. Write a short program to illustrate both using pointers. (CO4)

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c. Explain how pointers can be used with arrays and objects. Describe the use of the 'this' pointer and pointer to derived class with suitable examples. (CO4)

Q5. (2X10=20 Marks)

a. Define polymorphism. Differentiate between compile-time and runtime polymorphism. Illustrate runtime polymorphism using virtual functions with an example. (CO5)

b. Discuss in detail the concept of static and dynamic binding. Compare their memory allocation, execution time, and typical use cases. Support your answer with appropriate C++ examples. (CO5)

c. Explain the basic functions of the C++ I/O system. Write a program using file stream classes (ifstream, ofstream) to read employee records from a file and write them to another file. Discuss file opening modes, error handling, and file closing operations. (CO5)