Graphic Era HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

Term Evaluation (Odd) Semester Examination September 2025

Roll no.....

Name of the Course: BCA
Semester: V
Name of the Paper: Introduction to Java Programming
Paper Code: TBC 501
Time: 1.5 hour **Maximum Marks: 50**

Note:

(i) Answer all the questions by choosing any one of the sub-questions
(ii) Each question carries 10 marks.

Q1 (10 Marks)

(a) Discuss the concept of Java bytecode. How does bytecode enable "write once, run anywhere" (WORA)? Provide a scenario demonstrating the same program running on Windows, Linux, and macOS. CO1

OR

(b) Explain the concept of polymorphism in Java. Discuss the differences between compile-time (method overloading) and runtime (method overriding) polymorphism. Provide examples demonstrating each type. CO3

Q2 (10 Marks)

(a) Write a Java program to declare, initialize, and traverse an array. Explain the difference between single-dimensional and multi-dimensional arrays. CO3

OR

(b) Create a class with local, instance, and static variables. Write a program to display their values and explain the scope and lifetime of each variable. CO2

Q3 (10 Marks)

(a) Explain the String class in Java. Discuss how strings are immutable and the advantages of immutability. Provide examples of string initialization and concatenation. CO3

OR

(b) Write a program demonstrating the use of abstract classes and methods. Explain how abstract classes enforce method implementation in subclasses. CO3

Q4 (10 Marks)

(a) Write a Java program to demonstrate the use of blank final variables and static blank final variables. Explain how and when they must be initialized. Also, discuss why blank final variables can only be assigned once and how static blank final variables belong to the class rather than individual objects. CO2

OR

(b) Discuss the advantages of using the super keyword in object-oriented programming. How does it improve code reusability, maintainability, and clarity in inheritance hierarchies? CO1

Q5 (10 Marks)

(a) Compare interfaces and abstract classes in terms of flexibility, multiple inheritance, and implementation requirements. CO3

OR

(b) Discuss the advantages and limitations of using the Scanner class for input in Java. Write a program to accept marks of five students and calculate the average using Scanner class. CO2

Note For the question paper setters:

- Question paper should cover all the COs of the course.
- Please specify COs against each question.