

Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 5 – EXAMINATION – SUMMER 2026

Subject Code: 3153203

Date: 30/05/2026

Subject Name: Object Oriented Programming with Java

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Simple and non-programmable scientific calculators are allowed.**

- Q.1**
- (a) Describe the process of Java program execution from source code to output. **03**
 - (b) Explain the concept of encapsulation in Java. Write a program to show how data hiding is achieved using getters and setters. **04**
 - (c) Explain method overloading and method overriding in Java with suitable example. **07**
- Q.2**
- (a) Explain how the keywords throw, throws, and finally are used in Java programs for handling exceptions. **03**
 - (b) Define exception handling in Java. Why is it needed? **04**
 - (c) Explain the lifecycle of a thread with a neat labeled diagram. Discuss the state transitions and the role of methods like sleep(), wait(), notify(), and start() . **07**
- OR**
- Q.2**
- (c) Write a Java program to create and use a custom exception class named InvalidAgeException. The program should accept age from the user and throw this exception if the age < 0 (zero). **07**
- Q.3**
- (a) Explain the concept of autoboxing and unboxing with respect to wrapper classes in Java. **03**
 - (b) Explain how Java overcomes the limitation of multiple inheritance using interfaces. Give a suitable example. **04**
 - (c) Discuss thread synchronization in Java. Explain how synchronized methods and blocks help in avoiding race conditions with an example. **07**
- OR**
- Q.3**
- (a) Discuss the concept of String immutability in Java. Why is it important for security and performance? **03**
 - (b) Write a Java program to create a class Student with data members id, name, and marks. Use a parameterized constructor to initialize the data and a method to display student details. **04**
 - (c) Discuss the working of DatagramSocket and DatagramPacket classes in Java networking with suitable example. **07**
- Q.4**
- (a) List advantages of using packages in Java. **03**
 - (b) Compare ArrayList and LinkedList in Java with at least four distinguishing points. **04**
 - (c) Explain the steps to create, write, and read a text file in Java using the appropriate stream classes with appropriate code snippets. **07**

OR

Q.4	(a) Explain the process of creating and using a user-defined package in Java with an example.	03
	(b) Discuss the role of InputStream and OutputStream classes in Java's stream-based I/O system.	04
	(c) Write a Java program using the ArrayList class to store ten integers and display their sum and average.	07
Q.5	(a) Define association, aggregation, and composition in UML.	03
	(b) Explain the purpose and notations of a state diagram with an example.	04
	(c) Develop a Sequence Diagram for an Online Railway Reservation System showing interactions among User, Reservation System, and Payment Gateway.	07
	OR	
Q.5	(a) What is meant by N-ary association in UML? Describe its usage with a real-world example.	03
	(b) Describe the general structure of a use case diagram. Draw a simple use case diagram for an ATM system.	04
	(c) Draw a Class Diagram for a Library Management System showing relationships between Book, Member, Librarian, and Book Transaction.	07
