IoT 4th

(T) Roll No. .....

PAPER ID—21135

B.Tech. EXAMINATION, 2026

(Fourth Semester)

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Programming in Java

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. Attempt all the subparts :

   (a) State the naming conventions used for Java classes and methods. 2

   (b) Why final keyword is used ? 2

   (c) What is the purpose of garbage collection in Java. 2

   (d) Name the two ways for the implementation of threads in JAVA. 2

   (e) Define CLASSPATH. 2

   (f) Differentiate between executeQuery() and executeUpdate() methods. 2

   (g) What is a Callable Statement ? 2

Unit I

2. (a) Describe the Object-Oriented Programming (OOP) structure in Java. Explain OOPs concepts suitable examples. 7

   (b) Differentiate between JVM, JRE and JDK. Explain their relationship with the help of a suitable diagram. 7

3. (a) Discuss Java data types and type casting in detail. Differentiate between implicit and explicit type casting with examples. 7

   (b) Explain the security promises of JVM, sandbox model, security policy, and major security aspects in Java applications. 7

Unit II

4. (a) Explain abstract classes and methods in Java. Differentiate between abstract class and interface. Write an abstract class Vehicle with abstract method start() and implement it in subclass Car. 7

   (b) Illustrate the use of *constructors* in Java. Explain constructor chaining. Write a class Employee with attributes id, name and salary. Use constructor chaining to initialize values and create objects. 7

5. (a) A program needs frequent modification of strings such as insertion and deletion operations. Which class should be used between String and StringBuffer ? Justify your answer with a program example. 7

(b) A web-based educational platform wants to display an interactive calculator using a Java applet. Explain the life cycle of a Java applet. Describe the role of various applet methods. Write a simple applet program to display a message "Welcome to Calculator Applet". 7

Unit III

6. (a) Explain inter-thread communication using wait(), notify() and notifyAll() methods. Illustrate with an example. 7

(b) Discuss different layout managers in Java such as BorderLayout, FlowLayout, GridLayout, and GridBagLayout with examples. 7

7. (a) **Describe** different access specifiers in **Java with** examples. 7

(b) **Differentiate** between exceptions and **errors in** Java. Explain the importance of **exception** handling for building robust **applications**. 7

Unit IV

8. (a) Explain the role and importance of the Java Collection Framework. Describe **different types of collections** such as List **and Set with suitable examples**. 7

(b) What are Comparable and Comparator interfaces ? Differentiate between them with examples. 7

9. (a) Discuss various JDBC drivers and drivers. What are their advantages and limitations ? 7

(b) Write and explain JDBC code for basic operations: INSERT, UPDATE, DELETE and SELECT. 7

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