Q.1 What is Java?

Java is a high-level, class-based, object-oriented programming language designed to have as few implementation dependencies as possible. It is widely known for its "Write Once, Run Anywhere" (WORA) capability, meaning code compiled on one platform (like Windows) can run on any other platform (like Linux or macOS) without recompilation.

Q.2 What are the features of Java?

The key features of Java are:

- Object-Oriented: Everything in Java is an object (except primitive data types), making code modular and reusable.
- Platform Independent: Java code is compiled into *bytecode* (class files), which can run on any machine that has a JVM.
- Simple: It removed complex features of C++ like pointers and operator overloading.
- Secure: Java runs inside a virtual machine sandbox and has no explicit pointers, reducing security threats.
- Robust: It has strong memory management (Garbage Collection) and exception handling.
- Multithreaded: It supports executing multiple tasks simultaneously.

Q.3 What is JDK and its components?

JDK (Java Development Kit) is a software development environment used to develop, compile, and debug Java applications.

Key Components of JDK:

1. Development Tools: Utilities like javac (compiler), java (launcher), javadoc (documentation generator), and jdb (debugger).
2. JRE (Java Runtime Environment): The environment required to run the Java code.

Q.4 Is JVM platform-independent?

No, the JVM (Java Virtual Machine) is NOT platform-independent.

While *Java code* is platform-independent, the *JVM* is platform-dependent. You need a specific JVM designed for Windows to run Java on Windows and a different JVM designed for Linux to run Java on Linux. The JVM acts as a translator that converts the universal Java bytecode into the specific machine language of your operating system

Q.5 What is the difference between JDK and JRE?

JDK (Java Development Kit):

- Used to develop, compile, and debug Java applications
- Includes JRE + development tools
- Contains compiler (javac)
- Includes tools like java, javadoc, jdb, jar, etc.
- Required by developers
- Can both create and run Java programs

JRE (Java Runtime Environment):

- Used only to run Java applications
- Includes JVM + core libraries
- Does not contain development tools
- Cannot compile Java code
- Required by end-users who run Java applications
- Focused solely on execution, not development
- JDK = JRE + Development Tools
- JRE = JVM + Libraries to run Java