MCQ

1. **Which component of the JVM is responsible for loading class files?**  
   a) Class Loader  
   b) Bytecode Verifier  
   c) Interpreter  
   d) JIT Compiler  
   **Answer:** a) Class Loader  
   **Explanation:** The Class Loader loads class files into the JVM at runtime.
2. **The part of JVM responsible for converting bytecode into machine code at runtime is:**  
   a) Interpreter  
   b) JIT Compiler  
   c) Garbage Collector  
   d) Class Loader  
   **Answer:** b) JIT Compiler  
   **Explanation:** The JIT (Just-In-Time) compiler improves performance by compiling bytecode to native code at runtime.
3. **Which memory area in the JVM stores class structures like metadata and static variables?**  
   a) Stack  
   b) Heap  
   c) Method Area  
   d) Program Counter  
   **Answer:** c) Method Area  
   **Explanation:** The method area holds class-related data, including static fields and method definitions.
4. **What does the Java Stack store?**  
   a) Class-level metadata  
   b) Object references only  
   c) Local variables and method call frames  
   d) All class instances  
   **Answer:** c) Local variables and method call frames  
   **Explanation:** Each thread has a stack storing frames for each method call.
5. **The Program Counter (PC) register in JVM is used to:**  
   a) Track memory allocation  
   b) Keep the address of the next bytecode instruction  
   c) Manage method parameters  
   d) Store constant values  
   **Answer:** b) Keep the address of the next bytecode instruction  
   **Explanation:** The PC register points to the address of the JVM instruction being executed.
6. **Which memory area in JVM is shared among all threads?**  
   a) Stack  
   b) Heap  
   c) Program Counter  
   d) Native Method Stack  
   **Answer:** b) Heap  
   **Explanation:** The heap is used to allocate memory for objects and is shared across all threads.
7. **Garbage collection in Java primarily aims to:**  
   a) Optimize bytecode  
   b) Manage CPU usage  
   c) Free memory by destroying unreachable objects  
   d) Compile Java programs  
   **Answer:** c) Free memory by destroying unreachable objects  
   **Explanation:** The GC reclaims memory occupied by objects no longer referenced.
8. **Which of the following is a valid garbage collection algorithm used in Java?**  
   a) Mark and Swap  
   b) Sweep and Compact  
   c) Mark and Sweep  
   d) Allocate and Destroy  
   **Answer:** c) Mark and Sweep  
   **Explanation:** “Mark and Sweep” is a classic algorithm used in many JVM GC implementations.
9. **In Java, objects become eligible for garbage collection when:**  
   a) They are assigned null  
   b) The program ends  
   c) They are no longer reachable  
   d) They are private  
   **Answer:** c) They are no longer reachable  
   **Explanation:** The key condition is unreachability from any live thread.
10. **Which of the following is not a primitive data type in Java?**  
    a) byte  
    b) short  
    c) String  
    d) boolean  
    **Answer:** c) String  
    **Explanation:** String is a class, not a primitive type.
11. **Which data type is used to store 64-bit integer values in Java?**  
    a) int  
    b) long  
    c) double  
    d) short  
    **Answer:** b) long  
    **Explanation:** long is a 64-bit signed integer.
12. **What is the default value of a boolean variable in Java (class level)?**  
    a) true  
    b) false  
    c) null  
    d) 0  
    **Answer:** b) false  
    **Explanation:** All uninitialized boolean fields in a class default to false.
13. **Which of the following can store decimal values in Java?**  
    a) int and byte  
    b) float and double  
    c) char and short  
    d) long and int  
    **Answer:** b) float and double  
    **Explanation:** float (32-bit) and double (64-bit) are used for real numbers.