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1. What types of data types are used in Java?
    a. Primitive Data Types
    b. Non-primitive Data Types
    c. Both A & B
    d. Non-linear Data Types

Ans: c. Both A & B

Explanation: In Java, there are two main data types: primitive data types (such as int, float, char, etc.) and non-primitive data types (such as classes, arrays, and interfaces).

2. What is meant by Java being a "statically typed" language?
    a. Variable made at runtime
    b. Type must be given before use
    c. Java can't use memory
    d. Variable can change type

Answer: b. Type must be given before use

Explanation: In statically typed languages like Java, every variable must be declared with a type before it's used.

3. Which of the following is a **primitive** data type in Java?
    a. Array
    b. String
    c. float
    d. Class

Answer: c. float

Explanation: Java has 8 primitive types: byte, short, int, long, float, double, boolean, and char. **float** is one of them.

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4. What makes Strings in Java different from primitive data types?
    a. They are declared using the var keyword
    b. They refer to objects in memory
    c. They are numeric values
    d. They are evaluated at compile-time

Answer: b. They refer to objects in memory

Explanation: Strings in Java are non-primitive and refer to objects, unlike primitive types, which store actual values.

5. Which integer data type consumes the least memory?
    a. int
    b. short
    c. byte
    d. long

Answer: c. byte

Explanation: byte uses only 1 byte (8 bits) and is the smallest integer data type in Java.

6. When would using **short** instead of **int** be appropriate in Java?
    a. When the number is greater than 10^9
    b. When storing fractional numbers
    c. To save memory for values in the range -32,768 to 32,767
    d. When precision is a concern

Answer: c. To save memory for values in the range -32,768 to 32,767

Explanation: short is 2 bytes and suitable when the number fits within its range and memory savings are needed.

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7. What is the default size of the **int** data type in Java?
    a. 2 bytes
    b. 4 bytes
    c. 8 bytes
    d. 1 byte

Answer: b. 4 bytes

Explanation: **int** occupies 4 bytes and is the most commonly used integer type for general numeric operations.

8. Which integer type can store the largest range of values?
    a. byte
    b. int
    c. long
    d. short

Answer: c. long

Explanation: long can store values from -2^{63} to $2^{63}-1$ and is used for very large integers.

9. What suffix is required for assigning a value to a long type variable?
    a. d
    b. f
    c. i
    d. L

Answer: d. L

Explanation: Java long literals should be suffixed with L to distinguish them from int.

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10. What is the key difference between float and double in Java?
    a. A float is more accurate
    b. double is smaller in size
    c. double has higher precision
    d. float uses more memory

Answer: c. double has higher precision

Explanation: double uses 8 bytes and offers higher precision (~15 decimal digits) than float (~6-7 digits).

11. Which suffix is necessary when assigning a value to a float variable?
    a. d
    b. f
    c. L
    d. None

Answer: b. f

Explanation: Float values should be suffixed with f (e.g., 5.75f) to distinguish them from double.

12. What type of numbers do float and double represent?
    a. Whole numbers
    b. Boolean values
    c. Fractional numbers
    d. Unicode characters

Answer: c. Fractional numbers

Explanation: float and double are used to represent fractional (decimal) numbers.

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13. In terms of number precision, when should double be preferred over float?
    a. When fewer digits are required
    b. When performing text processing
    c. When higher accuracy is needed in calculations
    d. When storing binary data

Answer: c. When higher accuracy is needed in calculations

Explanation: double is more accurate and preferred in financial or scientific calculations where precision matters.

14. How many decimal digits can a float accurately store?
    a. 3
    b. 6 to 7
    c. 9 to 10
    d. 15

Answer: b. 6 to 7

Explanation: float provides precision up to about 6-7 decimal digits.

15. What does scientific notation in Java allow in floating-point numbers?
    a. Use of hexadecimal
    b. Representation using powers of 10
    c. Character manipulation
    d. Unicode representations

Answer: b. Representation using powers of 10

Explanation: Scientific notation like 3.5e4 represents 3.5×10^4.

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16. What are the only two values a boolean can take in Java?
    a. 1 and 0
    b. true and false
    c. yes and no
    d. on and off

Answer: b. true and false

Explanation: Booleans in Java can only be true or false.

17. Where is the boolean type most commonly used in Java programs?
    a. String manipulation
    b. Loop counters
    c. Conditional expressions
    d. File operations

Answer: c. Conditional expressions

Explanation: Boolean values are primarily used for conditional decision-making (e.g., if, while).

18. What is the size of the boolean type in Java?
    a. 4 bytes
    b. 1 bit
    c. 8 bytes
    d. 2 bits

Answer: b. 1 bit

Explanation: Conceptually, a boolean occupies 1 bit to store true or false, though memory allocation depends on the JVM.

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19. What is the size of the char type in Java?

a. 1 byte
b. 2 bytes
c. 4 bytes
d. 8 bits

Answer: b. 2 bytes

Explanation: char in Java uses 2 bytes due to Unicode support.

20. What character encoding system does Java use?

a. ASCII
b. UTF-8
c. Unicode
d. ISO-8859-1

Answer: c. Unicode

Explanation: Java uses Unicode, which allows support for international characters and symbols.

21. What is the lowest value a Java character can have in Unicode?

a. 0
b. 'a'
c. \u0000
d. 1

Answer: c. \u0000

Explanation: Unicode starts at \u0000, representing the null character.

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22. What kind of quotes must be used to declare a char value in Java?
    a. Double quotes
    b. No quotes
    c. Backticks
    d. Single quotes

Answer: d. Single quotes

Explanation: Characters in Java must be enclosed in single quotes (e.g., 'A').

23. How are string values enclosed in Java?
    a. Single quotes
    b. Parentheses
    c. Double quotes
    d. Angle brackets

Answer: c. Double quotes

Explanation: String values are enclosed in double quotes (e.g., "Hello").

24. What type of data is String considered in Java?
    a. Primitive data type
    b. Non-primitive data type
    c. Numeric data type
    d. Boolean data type

Answer: b. Non-primitive data type

Explanation: The PPT states that String is a non-primitive type because it refers to objects and has methods.

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25. Which of the following statements about Java Strings is true?

a. They are stored as characters
b. They are a form of primitive data
c. They are objects and have methods
d. They store boolean values

Answer: c. They are objects and have methods

Explanation: Strings are objects in Java with many built-in methods (e.g., .length(), .substring()).

26. What is the range of values for the byte data type in Java?

a. 0 to 255
b. -128 to 127
c. -256 to 255
d. -128 to 128

Answer: b. -128 to 127

Explanation: byte is an 8-bit signed data type with a value range from -128 to 127.

27. Why might a developer prefer using byte instead of int?

a. To represent boolean values
b. For more precise decimal operations
c. To save memory when values fit in the byte range
d. To avoid rounding errors

Answer: c. To save memory when values fit in the byte range

Explanation: When values are guaranteed to fall within the byte range, byte conserves memory over larger types like int.

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28. Which primitive data type should be chosen for values like population counts, which may exceed 2 billion?
    a. int
    b. short
    c. long
    d. byte

Answer: c. long

Explanation: long supports very large numbers beyond the range of int (±2.14 billion).

29. Which of the following is the correct use case of the double data type?
    a. Storing small integers
    b. Representing a Unicode character
    c. Performing scientific calculations with decimal precision
    d. Storing true/false conditions

Answer: c. Performing scientific calculations with decimal precision

Explanation: double provides precision suitable for scientific and high-accuracy decimal operations.

30. What is the default value of an uninitialized boolean variable in a Java object?
    a. true
    b. 0
    c. false
    d. null

Answer: c. false

Explanation: By default, the value of a boolean in Java is false if it's a member of a class.

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31. Which data type would be most efficient in terms of memory usage for storing a person's age (0–120)?
    a. int
    b. short
    c. long
    d. byte

Answer: d. byte

Explanation: Since age fits within -128 to 127, a byte is sufficient and efficient.

32. What type should be used if decimal precision beyond 7 digits is essential?
    a. float
    b. int
    c. byte
    d. double

Answer: d. double

Explanation: double is preferred when higher decimal precision (up to ~15 digits) is needed.

33. Which values can a boolean data type store in Java?
    a. true and false
    b. yes and no
    c. 0 and 1
    d. on and off

Answer: a. true and false

Explanation: The PPT shows that boolean stores logical values like true or false and is used for conditional testing.

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34. Which of the following primitive types is **not** numeric?

a. double
b. boolean
c. int
d. long

Answer: b. boolean

Explanation: boolean represents logical values, not numeric data.

35. Which value is the lowest possible for a char in Unicode in Java?

a. \uFFFE
b. \uFFFF
c. \u0000
d. 255

Answer: c. \uFFFF

Explanation: The highest possible value for char in Java's Unicode range is \uFFFF.

36. Which of the following statements is **true** about Java character encoding?

a. Java uses ASCII like C
b. Java characters are encoded using UTF-32
c. Java supports multiple encodings, but stores characters using Unicode
d. Java does not support international character sets

Answer: c. Java supports multiple encodings, but stores characters using Unicode

Explanation: Java uses Unicode, supporting global languages and symbols in a standard way.

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37. Why does Java use 2 bytes for the char type instead of 1 byte like C?
    a. For faster computation
    b. For backward compatibility
    c. To support Unicode, which requires more space
    d. To support floating-point characters

Answer: c. To support Unicode, which requires more space

Explanation: Unicode supports a vast range of international characters, requiring 2 bytes in Java's char.

38. Which of the following is considered a non-primitive type in Java?
    a. char
    b. boolean
    c. double
    d. interface

Answer: d. interface

Explanation: Interfaces are part of non-primitive types in Java and are used to define behavior contracts.

39. Arrays in Java are categorized as what type of data?
    a. Numeric
    b. Primitive
    c. Non-primitive
    d. Literal

Answer: c. Non-primitive

Explanation: Arrays are non-primitive because they reference memory locations and are objects.

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40. What distinguishes non-primitive data types from primitive types in Java?
    a. They are smaller
    b. They don't require a type declaration
    c. They store memory addresses of objects
    d. They can hold boolean values

Answer: c. They store memory addresses of objects

Explanation: Non-primitive types like arrays, classes, and strings store memory references, not direct values.

41. Which of the following operations can be performed directly on a primitive type but not on non-primitive types?
    a. Method calls
    b. Value comparison with ==
    c. Direct assignment
    d. Object instantiation

Answer: c. Direct assignment

Explanation: Primitive types support direct value assignment; non-primitives require reference/object handling.

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42. Why is String considered a non-primitive data type?
    a. It stores only numeric values
    b. It cannot be used in Java
    c. It refers to objects in memory
    d. It is a type of boolean

Answer: c. It refers to objects in memory

Explanation: Strings are non-primitive types in Java because they store references to objects, not actual values.

43. How are scientific numbers written in Java?
    a. Using %
    b. Using #
    c. Using e or E
    d. Using &

Answer: c. Using e or E

Explanation: In Java, scientific notation is written using e or E to represent powers of 10. For example, 3.5e4 means $3.5 \times 10^4 = 35000$.

44. In which format is the number 3.5e4 represented in Java?
    a. Binary
    b. Hexadecimal
    c. Scientific notation
    d. ASCII

Answer: c. Scientific notation

Explanation: 3.5e4 is a number written in scientific notation, which means 3.5×10^4. Java treats this as a double-precision floating-point number.

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45. What is the highest Unicode value for a char in Java?

a. 255
b. \uFFFF
c. \u0000
d. 65536

Answer: b. \uFFFF

Explanation: In Java, char is a 16-bit unsigned data type that holds a single Unicode character. Its highest value is \uFFFF, which is 65535 in decimal. Unicode goes up to \uFFFF for the char type (not 65536, as counting starts from 0).