Chapter – 4 OPERATORS IN JAVA Assignment Questions with Answers

1. **Write the difference between**:

i. ++ and + operator:
++ increments a value by 1; + is for addition.
ii. Pure and Mixed Expression:
Pure: Same data types (e.g., int + int)
Mixed: Different types (e.g., int + float)
iii. = and ==:
= assigns value; == checks equality.

2. **What are logical operators? Give an example of each.**

Logical operators: && (AND), || (OR), ! (NOT)
Examples:
a > 5 && b < 10
x < 3 || y > 5
!(a == b)

3. **What is an assignment operator? Give an example.**

Assignment operator assigns a value to a variable.
Example: int a = 5;

4. **Explain the shorthand assignment operator with an example.**

It combines arithmetic with assignment.
Example: x += 3 is same as x = x + 3

5. **What is the use and syntax of a ternary operator?**

Used for conditional expressions.
Syntax: (condition) ? expr1 : expr2;
Example: max = (a > b) ? a : b;

6. **Evaluate: a = 5, b = 9**
   Expression: a += a++ - ++b + a;

   a = 5 + 5 - 10 + 6 = 6, final a = 6

7. **Evaluate: x = 3, y = 7**
   Expression: x -= x++ - ++y;

   x = 3 - 3 - 8 = -5 → x = 4 - (-5) = 9

8. **What will be the output if x = 5:**
   5 * ++x and 5 * x++

5 * ++x = 30 (x becomes 6 after this)
5 * x++ = 25 (x becomes 6 after this)

9. What are precedence and associativity?

Precedence: order of operations
Associativity: order of operators with same precedence (e.g., left-to-right)

10. Evaluate expressions with a = 2, b = 3, c = 3

i. a - (b++) * (--c) → 2 - 3*2 = -4
ii. a * (++b) % c → 2 * 4 % 3 = 2

11. What is concatenation? On what data type is it performed?

Concatenation joins strings.
Performed on: String
Example: "Hello" + "World"

12. Evaluate expressions: NOTE : WRITE QUESTION THEN SOLVE BY YOURSELF

i. k=5, j=9 → k = 21, j = 10 → Output: 10 21
ii. a=2, b=3, c=9 → d = -22
iii. a=10, b=5 → a = 40
iv. a=50, b=40 → g = 60
v. x = ++y + 2y if y=6 → x = 19
vi. s = ++j + 5 if j=10 → s = 16
vii. s = (-a + --b)/c if a=10, b=15, c=5 → s = 0
viii. w = (b++ * ++a * --c) if a=4, b=8, c=12 → w = 440

13. Write the output: NOTE : WRITE QUESTION THEN SOLVE BY YOURSELF

i. a=5, b=10 → c = 120 → Output: 6 120
ii. m=2, n=15 → m = 34 → Output: 34 16
iii. System.out.println(2+3 + "Hello"); → 5Hello
iv. System.out.println("Hello" + (2+3)); → Hello5
v. (1>0) && (0>1) → false
vi. (0>1) || (0==1) → false
vii. boolean ch = ('a' >= 97 && 'a' <= 100)? true : false; → true
viii. Output:
tag Heuer
RolexBentleyRado
ix. int n = 125; System.out.print(--n * 2); → 248

14. What will be the result of the following two expressions if i = 10 initially?

i. ++i <= 10 → false
ii. i++ <= 10 → true

15. **Consider the following code snippet:**

```
int i = 10;
int n = i++ % 5;
```

After execution:
i = 11
n = 0

16. Rewrite the following statements without using shorthand operators:

i. p /= q → p = p / q;
ii. p -= 1 → p = p - 1;
iii. p *= q + r → p = p * (q + r);
iv. p -= q - r → p = p - (q - r);

17. In the expression x = a + b - c + d; identify operators and operands:

Operators: =, +, -
Operands: x, a, b, c, d

18. **Write the Java expressions for the following: WRITE QUESTION**

i. (a + b)^2 + b → (a + b)*(a + b) + b
ii. a^2 + b^2 → (a * a) + (b * b)
iii. z = x^3 + y^3 + xy/3 → z = (x*x*x) + (y*y*y) + ((x*y)/3);
iv. (a^2 + b^2)/(a^2 - b^2) → ((a*a) + (b*b)) / ((a*a) - (b*b))
v. z = (ab + bc + ca)/3abc → z = (a*b + b*c + c*a) / (3*a*b*c);
vi. 0 ≤ s ≤ 50 → (s >= 0) && (s <= 50)
vii. c = (a^2 + b^2)^3 → c = Math.pow((a*a + b*b), 3);
viii. c = πr^2h → c = 3.14 * r * r * h;
ix. πr^2 + πr^3 → 3.14 * r * r + 3.14 * r * r * r;

Q19. Difference Between `x = -5;` and `x -= 5;`
x -= 5; Subtracts 5 from the current value of x (i.e., `x = x - 5;`).
x = -5; Assigns -5 to x.

Example:

```
int x = -5; // x is now -5
x -= 5;     // x becomes -10
```

Q20. Output of the following program:

```
public class Test
{
   public static void main(String[] args)
{
      int a = 1, b = 2;
      System.out.println("Output1: " + a + b);
      System.out.println("Output2: " + (a + b));
   }
```

```
}
```
Output:
Output1: 12
Output2: 3

Q21. Output of the following program:

```
class PredictOutput1
{
   public static void main(String[] args)
{
      int a = 4, b = 2, c = 3;
      System.out.println("Output 1: " + (a = b * c));
      System.out.println("Output 2: " + (a = (b * c)));
   }
}
```
Output:
Output 1: 6
Output 2: 6

Q22. Output of the following program:

```
class PredictOutput2
{
   public static void main(String[] args)
{
      int a = 6, b = 2, c = 3;
      System.out.println("Output 1: " + (a == b * c));
      System.out.println("Output 2: " + (a == (b * c)));
   }
}
```
Output:
Output 1: true
Output 2: true

Q23. Output of the following program:

```
class PredictOutput3
 {
   public static void main(String[] args)
{
      int a = 2, b = 2, c = 2;
      System.out.println("Output 1: " + (a + 2 < b * c));
      System.out.println("Output 2: " + (a + 2 < (b * c)));
   }
}
```
Output:
Output 1: false

Output 2: false

Q24. Absolute value using conditional operator:
WRITE QUESTION

```
int abs = (x < 0) ? -x : x;
```

Q25. **Average of 155.5, 80.0, 90.5:**
WRITE QUESTION

```
class AverageCalculator
{
  public static void main(String[] args)
{
    double a = 155.5, b = 80.0, c = 90.5;
    double avg = (a + b + c) / 3;
    System.out.println("Average: " + avg);
  }
}
```

Q26. Total distance by athlete:
WRITE QUESTION

```
class TriangleDistance
{
  public static void main(String[] args)
{
    int a = 25, b = 35, c = 45;
    int perimeter = a + b + c;
    int totalDistance = perimeter * 18;
    System.out.println("Total distance: " + totalDistance + " meters");
  }
}
```

Q27. Cost of tilling land:
WRITE QUESTION

```
class TillingCost
{
  public static void main(String[] args)
{
    double length = 500, width = 200;
    double area = length * width;
    double cost = (area / 100) * 80;
    System.out.println("Tilling cost: Rs. " + cost);
  }
}
```