Exam 2: Online Version

1. Which if statement below tests if letter holds R? (letter is a char variable)
   a. if (letter == "R")
   b. if (letter >= 'R')
   c. if (letter == R)
   d. if (letter = 'R')
   e. if (letter == 'R')

2. What are if statements used for in programs?
   a. Repeating commands
   b. Storing data
   c. Numeric calculations
   d. Numeric casts
   e. Making decisions

3. The following if statement tests the rainfall in New York's Central Park during the months of June, July and August.

```
if (low <= rain && rain <= high)
      System.out.println("Rainfall amount is normal.");
else
      System.out.println("Rainfall amount is abnormal.");
```

   It could be replaced with:

   I.
```
if (rain >= low) {
      if (rain <= high)
            System.out.println("Rainfall amount is normal.");
} else
      System.out.println("Rainfall amount is normal");
```

   II.
```
if (rain >= low) {
      if (rain <= high)
            System.out.println("Rainfall amount is normal.");
      else
            System.out.println("Rainfall amount is abnormal.");
} else
      System.out.println("Rainfall amount is abnormal.");
```

   III.
```
if (rain >= low)
      System.out.println("Rainfall amount is normal.");
else if (rain <= high)
      System.out.println("Rainfall amount is normal.");
else
      System.out.println("Rainfall amount is abnormal.");
```

   a. I only
   b. II only
   c. III only
   d. II or III
   e. I, II or III

4. What is output by the following code?

```
int x = 36 % 8;
if (x >= 10)
      System.out.println(1);
else if (x >= 8)
      System.out.println(2);
else if (x >= 6)
      System.out.println(3);
else if (x >= 4)
      System.out.println(4);
else
      System.out.println(5);
```

a. 1 b. 2 c. 3 d. 4 e. 5

5. Consider the code:

```
if (y == 0 || x*y > 10)
```

Which of the following is an example of short circuit evaluation?

a. if `x*y > 10 is` false it evaluates `y == 0`
b. if `x*y > 10 is` false it doesn't evaluate `== 0`
c. if `y == 0` is false it doesn't evaluate `x*y > 10`
d. if `y == 0` is true it doesn't evaluate `x*y > 10`
e. if `y == 0` is false it evaluates `x*y > 10`

6. The following truth table matches which boolean condition?

A	B	?
T	T	T
T	F	T
F	T	F
F	F	T

a. `A && ( A || B )`
b. `A || ( !A && !B )`
c. `A && ( A && B )`
d. `!A && ( A || B )`
e. `A || ( A || B )`

7. Consider the code:

```
if (a < b && c != d)
```

Which of the following is an example of short circuit evaluation?

a. if a < b is true it doesn't evaluate c != d
b. if a < b is false it doesn't evaluate c != d
c. if c != d is false it evaluates a < b
d. if c != d is true it doesn't evaluate a < b
e. if a < b is true it evaluates c != d

8. `!( x < y && w == z)` is the same as which boolean expression?
   a. `x <= y && w == z`
   b. `x >= y || w != z`
   c. `z <= y || w != z`
   d. `x <= y && w != z`
   e. `x < y && w != z`

9. Assume that x and y are boolean variables and have been properly initialized.

```
!(x || y) || (x || y)
```

   The result of evaluating the expression above is best described as:
   a. always true
   b. always false
   c. true only when x is true and y is true
   d. true only when x and y have the same value
   e. true only when x and y have different values

10. What is output to the screen by the following code?

```
int c = 2;
while (c < 6) {
      System.out.print( (int)Math.pow(-1, c) + " ");
      c++;
}
```

   a. -1 1 -1 1 -1 1 -1
   b. 1 -1 1 -1
   c. -1 1 -1 1 -1 1
   d. 1 1 1 1 1 1
   e. -1 -1 -1 -1 -1 -1

11. How many times will the following loop repeat?

```
int num = 49;
while (num > 0) {
      if (num % 2 == 0)
            num++;
      else
            num--;
}
```

   a. 20 b. 21 c. 22 d. 23 e. Infinite Loop

12. What is output to the screen by the following code?

```
int num = 1987;
while (num > 0) {
      num = num/10;
      System.out.print(num%10 + " ");
}
```

   a. 8 9 1 0
   b. 198 19 1 0
   c. 19 1 0 0
   d. 7 8 9 1
   e. The loop will not terminate

13. The following loop is intended to print the even numbers from 20 to 26 inclusive:

```
int x = 20;
while (x < 26) {
      System.out.print(x);
      x++;
}
```

Which of the following changes would allow the code to work correctly?

a. The x++ needs to be x += 2
b. The x++ needs to be x += 2 and the x < 26 needs to be <=
c. The x < 26 needs to be <=
d. It needs an if statement: if (x%2 == 0)
e. Nothing, the code works as written.

14. The following code is intended to input three integers and print the average:

```
System.out.println("Please enter three integers: ");
int a = scan.nextInt();
int b = scan.nextInt();
int c = scan.nextInt();
System.out.println("The average is: " + 1.0 * a + b + c / 3);
```

What is a potential problem with the code as written?

a. It needs ( ) so the order of operations happens correctly.
b. No correction needed, the code will work as written.
c. It should be divided by 2, not 3.
d. It should use scan.nextDouble instead of scan.nextInt.
e. The parentheses are not needed and will cause a mathematical error.

15. Which of the following needs a cast?

a. char stored in an int variable
b. double stored in an int variable
c. char stored in a String variable
d. int stored in a double variable
e. char stored in a double variable

16. Consider the following code segment:

```
int c = 1;
while (c <= 10) {
      if (c%3 == 1)
            System.out.print(c + " ");
      c++;
}
```

Which of the following produce the exact same output?

I.
```
int c = 1;
while (c <= 10) {
      c++;
      if (c%3 == 1)
            System.out.print(c + " ");
}
```

II.
```
int c = 1;
while (c <= 10) {
      System.out.print(c + " ");
      c += 3;
}
```

III.
```
int c = 0;
while (c <= 10) {
      c++;
      if (c%3 == 1)
            System.out.print(c + " ");
}
```

a. I only
b. II only
c. III only
d. II and III only
e. I, II and III

17. Which of the following correctly gives random numbers between -10 and 10 inclusive?

a. `int n = (int)(Math.random() * 20) - 10;`
b. `int n = (int)(Math.random() * 21) - 10;`
c. `int n = (int)(Math.random() * 11) - 20;`
d. `int n = (int)(Math.random() * 10) - 20;`
e. `int n = (int)(Math.random() * 10) - 21;`

18. Consider the following code:

```
int count = 4;
while (count <= 7) {
      count++;
      System.out.print(count + " ");
}
```

What are the first and last numbers output?

a. 4 7 b. 4 8 c. 5 7 d. 5 8 e. Nothing is output.

19. Consider the following code:

```
int diff = 0;
if (Math.abs(num1 - num2) == (num1 - num2))
      diff = num1 - num2;
else if (Math.abs(num2 - num1) == (num2 - num1))
      diff = num2 - num1;
```

Which of the following will have the exact same result?

I.
```
int diff = Math.abs( num1 ) - num2;
```
II.
```
int diff = Math.abs( num1 - num2 );
```
III.
```
int diff = Math.abs( num2 - num1 );
```

a. I only
b. II only
c. III only
d. II and III only
e. I, II, and III

20. Of the following if statements, which one correctly executes exactly two commands only when the condition is true?

I.
```
if (y == 99) {
   System.out.println("A");
   System.out.println("B");
}
System.out.println("C");
```

II.
```
if (y == 99)
   System.out.println("A");
   System.out.println("B");
System.out.println("C");
```

III.
```
if (y == 99) {
   System.out.println("A");
   System.out.println("B");
}
```

a. I only
b. II only
c. III only
d. II and III but not I
e. I and III but not II

