AP-CSA-TEST-2-A -KEY (90 mins)

1. What does the following code print?

```
for (int i = 3; i <= 12; i++)
{
   System.out.print(i + " ");
}
```

A. 5 6 7 8 9 B. 4 5 6 7 8 9 10 11 12 C. 3 5 7 9 11 D. 3 4 5 6 7 8 9 10 11 12

2. Given the following statements, which options will print true?

```
String ursa = new String("2849");
String major = new String("2849");
```

I. `System.out.println(ursa.equals(major));`
II. `System.out.println(ursa == major);`
III. `System.out.println(ursa.equals("2849"));`
IV. `System.out.println(major == "2849");`

A. I and III B. II, and IV
C. only III D. I, II, III, IV

3. Consider the following class declaration. The following code segment appears in another class.

```
public class SomeClass
{
    private int num;
    public SomeClass(int n)
    {
        num = n;
    }
    public void increment(int more)
    {
        num = num + more;
    }
    public int getNum()
    {
        return num;
    }
}
```

```
SomeClass one = new SomeClass(100);
SomeClass two = new SomeClass(100);
SomeClass three = one;
one.increment(200);
System.out.println(one.getNum() + " " + two.getNum() + " " + three.getNum());
```

What is printed as a result of executing the code segment?

A. 100 100 100
B. 300 100 100
C. 300 100 300
D. 300 300 100
E. 300 300 300

4. How many stars are output when the following code is executed?

```
for (int i = 0; i < 5; i++) {
   for (int j = 0; j < 5; j++)
      System.out.println("*");
}
```

A. 5 B. 15 C. 25 D. 50

5. The following method is designed to return true if the passed phrase contains either the word cat or dog.

```
public boolean containsPet(String input){
  if (input.indexOf("cat") >= 0)
  {
      return true;
  }
  else if (input.indexOf("dog") >= 0)
  {
      return true;
  }
  else
  {
      return false;
  }
}
```

Which of the following test cases can be used to show the code does NOT work as intended?

A. containsPet("I have a dog.");
B. containsPet("I don't have pets.");
C. containsPet("I can catch fish.");
D. containsPet("My dog caught my cat");

6. Which of the following best describes the value of the Boolean expression shown below?

a && !(b || a)

A. The value is always true.
B. The value is always false.
C. The value is true when a has the value false, and is false otherwise.
D. The value is true when b has the value false, and is false otherwise.
E. The value is true when either a or b has the value true, and is false otherwise.

7. Consider the following code segments. Code segment 2 is a revision of code segment 1 in which the loop increment has been changed.

Code segment 1 prints the sum of the integers from 1 through 30, inclusive. Which of the following best explains

Code Segment 1

```
int sum = 0;
for (int k = 1; k <= 30; k++)
{
     sum += k;
}
System.out.println("The sum is: " + sum);
```

Code Segment 2

```
int sum = 0;
for (int k = 1; k <= 30; k = k + 2)
{
     sum += k;
}
System.out.println("The sum is: " + sum);
```

how the output changes from code segment 1 to code segment 2?

A. Code segment 1 and code segment 2 will produce the same output.
B. Code segment 2 will print the sum of only the even integers from 1 through 30, inclusive because it starts sum at zero, increments k by twos, and terminates when k exceeds 30.
C. Code segment 2 will print the sum of only the odd integers from 1 through 30, inclusive because it starts k at one, increments k by twos, and terminates when k exceeds 30.
D. Code segment 2 will print the sum of only the even integers from 1 through 60, inclusive because it starts sum at zero, increments k by twos, and iterates 30 times.

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

$$(x \;\&\&\; y) \&\&\; !\,(x \;||\; y)$$

Which of the following best describes the result of evaluating the expression above?

A. true always
B. false always
C. true only when x is true and y is true
D. true only when x and y have the same value

9. What values for x and y will cause the program to execute the /* missing code */?

```
if (x > 10)
 {
     x -= 5;
     if (x > 10 || y <= 10)
     {
         x ++;
         y++;
     }
     else
     {
         /* missing code */
     }
 }
```

A. x =18; y =12
B. x =12; y =12
C. x =12; y =8
D. x =18; y =18

10. What will the following code output when executed?

```
String breakfast = new String("Pizza");
String lunch = new String("Pizza");
String dinner = breakfast;

if (breakfast==lunch)
{
    System.out.print("A");
}
if (breakfast.equals(lunch))
{
    System.out.print("B");
}
if (breakfast==dinner)
{
    System.out.print("C");
}
else if (breakfast.equals(dinner))
{
    System.out.print("D");
}
else
{
    System.out.print("E");
}
```

A. BC
B. BCD
C. ABC
D. ABCD

11. What would the method call myMethod("Karel The Dog", 'e') return?

```
public int myMethod(String x, char y)
{
    int z = 1;
    for(int i = 0; i < x.length(); i++)
    {
        if(x.charAt(i) == y)
        {
            z++;
        }
    }
    return z;
}
```

A. -1 B. 1 C.2 D.3

12. Assume that x and y have been declared and initialized with int values. Consider the following Java expression.

```
(y > 10000) || (x > 1000 && x < 1500)
```

Which of the following is equivalent to the expression given above?

A. (y > 10000 | | x > 1000) && (y > 10000 | | x < 1500)

B. (y > 10000 | | x > 1000) | | (y > 10000 | | x < 1500)

C. (y > 10000) && (x > 1000 | | x < 1500)

D. (y > 10000 && x > 1000) | | (y > 10000 && x < 1500)

E. (y > 10000 && x > 1000) && (y > 10000 && x < 1500)

13. Given a, b, and c are properly initialized boolean values, what values would make the following expression false?

$$(a \,||\, b) \,||\, (b \,||\, c) \,||\, (!\, a \,||\, b);$$

A. a and b must be different values B. a must be false

C. b and c must have the same values D. Nothing. The expression will always be true.

14. What does the call to the method someMethod(3,2) output?

```
public int someMethod(int x, int y)
{
    int sum = 0;
    while (x < 10)
    {
        sum += x % y;
        x++;
        y++;
    }
    return sum;
}
```

A. 6 B. 7 C.8 D.9

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

$$(x \,||\, y) \,\&\&\, x$$

Which of the following always evaluates to the same value as the expression above?

A. x B. y C. x && y D. x || y

16. Consider the following two code segments. Code segment II is a revision of code segment I in which the loop header has been changed.

I.

```
for (int k = 1; k <= 5; k++)
{
     System.out.print(k);
}
```

II.

```
for (int k = 5; k >= 1; k--)
{
     System.out.print(k);
}
```

Which of the following best explains how the output changes from code segment I to code segment II?

A. Both code segments produce the same output, because they both iterate four times.

B. Both code segments produce the same output, because they both iterate five times.

C. Code segment I prints more values than code segment II does, because it iterates for one additional value of k.

D. Code segment II prints more values than code segment I, because it iterates for one additional value of k.

E. The code segments print the same values but in a different order, because code segment I iterates from 1 to 5 and code segment II iterates from 5 to 1.

17. Consider the following code segment.

```
String alpha = new String("APCS");
String beta = new String("APCS");
String delta = alpha;
System.out.println(alpha.equals(beta));
System.out.println(alpha == beta);
System.out.println(alpha == delta);
```

What is printed as a result of executing the code segment?

A.	B.	C.	D.	E.
false	false	true	true	true
false	false	false	false	true
false	true	false	true	true

18. What will the call to method patternGrid(3,4,'#') print?

```
public void patternGrid(int rows, int columns, char symbol)
{
    for(int m = 0; m < rows; m++)
    {
        for(int n = 0; n < columns; n++)
        {
            System.out.print(symbol);
        }
        System.out.println();
    }
}
```

A.
```
####
####
####
```

B.
```
###
###
###
```

C.
```
####
####
####
####
```

D. This code will error

19. What would the call to method divideByTen(540) output?

```
public int divideByTen(int num)
{
    while(num / 10 >= 10)
    {
        num /= 10;
    }
    return num;
}
```

A. 4 B. 54 C. 45 D. 540

20. Consider the following method:

```
public static String mystery(String word, int index)
{
    String result = "";
    for(int i = word.length()- 1; i > index; i--)
    {
        result += word.substring(i, word.length());
    }
    return result;
}
```

What is returned as a result of the call mystery("computer", 4)?

A. puter B. rerter C. retrer D. comcom

21. Consider the following code segment.

```
int count = 5;
while (count < 100)
{
     count = count * 2;
}
count = count + 1;
```

What will be the value of count as a result of executing the code segment?

A.100 B. 101 C. 160 D. 161 E. 321

22. Consider the following code segment:

```
int x = 10;
int y = 2;
int count = 1;
while(x > y)
{
    x /= y;
    count++;
}
```

What will the value of count be after executing the code segment?

A.1 B. 2 C. 3 D. 4 E. 10

23. Consider the following method.

```
public static int getTheResult(int n)
{
    int product = 1;
    for (int number = 1; number < n; number++)
    {
        if (number % 2 == 0)
            product *= number;
    }
    return product;
}
```

What value is returned as a result of the call getTheResult(8) ?

A.48 B. 105 C. 384 D. 5040 E. 40320

24. At a certain high school students receive letter grades based on the following scale.

Integer Score	Letter Grade
93 or above	A
From 84 to 92 inclusive	B
From 75 to 83 inclusive	C
Below 75	F

I.
```
if (score >= 93)
  grade = "A";
if (score >= 84 && score <= 92)
  grade = "B";
if (score >= 75 && score <= 83)
  grade = "C";
if (score < 75)
  grade = "F";
```

II.
```
if (score >= 93)
  grade = "A";
if (84 <= score <= 92)
  grade = "B";
if (75 <= score <= 83)
  grade = "C";
if (score < 75)
  grade = "F";
```

III.
```
if (score >= 93)
  grade = "A";
else if (score >= 84)
  grade = "B";
else if (score >= 75)
  grade = "C";
else
  grade = "F";
```

Which of the following code segments will assign the correct string to grade for a given integer score?

A. II only B. III only C. I and II only D. I and III only E. I, II, and III

25. Consider the following code segment:

```
String word = "Cafeteria";
for(/* missing condition */)
{
    System.out.print(word.substring(i+1,i+2) + " ");
}
```

The code segment is intended to print every other letter in the word, starting with index 0, to produce the result C f t r a.

Which of the following can be used to replace /* missing condition */ so that the code segment works as intended?

A. int i = 0; i < word.length(); i+=2 B. int i = -1; i < word.length(); i+=2

C. int i = 0; i < word.length(); i++ D. int i = -1; i <= word.length(); i+=2

26. Consider the following code segment.

```
int k = 0;
while (k < 10)
{
    System.out.print((k % 3) + " ");
    if ((k % 3) == 0)
        k = k + 2;
    else
        k++;
}
```

What is printed as a result of executing the code segment?

A. 0 2 1 0 2 B. 0 2 0 2 0 2 C. 0 2 1 0 2 1 0 D. 0 2 0 2 0 2 0

27. Consider the following code segment.

```
for (int k = 0; k < 20; k = k + 2)
{
  if (k % 3 == 1)
  {
    System.out.print(k + "  ");
  }
}
```

What is printed as a result of executing the code segment?

A. 4 16 B. 4 10 16 C. 0 6 12 18 D. 1 4 7 10 13 16 19 E. 0 2 4 6 8 10 12 14 16 18

28. A student is trying to determine if the following two expressions are equivalent.

A. x && (!x || y)

B. x && ! (x || !y)

What values of x and y would prove that the expressions are NOT equivalent?

A. x = false; y = false B. x = false; y = true C. x = true; y = false D. x = true; y = true

29. What will the values of x and y be after this code segment runs?

```
int x = 100;
int y = 100;
if (x <= 100)
{
    if (y > 100)
        x = 200;
    else
        x = 99;
}
else
    x++;
y = x + y;
```

A. x = 99; y = 199 B. x = 101; y = 201 C. x = 99; y = 100 D. x = 100; y = 200

30. Consider the following code segment, which is intended to print the sum of all the odd integers from 0 up to and including 101.

```
int r = 0;
int sum = 0;
/* missing loop header */
{
      if (r % 2 == 1)
      {
          sum += r;
      }
      r++;
}
System.out.println(sum);
```

Which of the following could replace /* missing loop header */ to ensure that the code segment will work as intended?

A. while (r <= 100) B. while (sum <= 100) C. while (r < 101) D. while (r <= 101)

31. Consider the following code segment.

```
String str = "abcdef";

for (int rep = 0; rep < str.length() - 1; rep++)

{

 System.out.print(str.substring(rep, rep + 2));

}
```

A. abcdef B. aabbccddeeff C. abbccddeef

D. abcbcdcdedef E. Nothing is printed because an IndexOutOfBoundsException is thrown

32. What will this program print if the value of grade is 80?

```
if(grade > 90)
{
    System.out.println("A");
}
else if(grade > 80)
{
    System.out.println("B");
}
else if(grade > 70)
{
    System.out.println("C");
}
```

A. A B. B C. C D.Nothing

33. Which expression is true?

A. true && !true B. !false || !true C. true && false D. false || false || !true

34. Consider the following method.

```
public void numberCheck(int maxNum)
{
    int typeA = 0;
    int typeB = 0;
    int typeC = 0;
    for (int k = 1; k <= maxNum; k++)
    {
        if (k % 2 == 0 && k % 5 == 0)
            typeA++;
        if (k % 2 == 0)
            typeB++;
        if (k % 5 == 0)
            typeC++;
    }
    System.out.println(typeA + " " + typeB + " " + typeC);
}
```

What is printed as a result of the call numberCheck(50) ?

A. 5 20 5 B. 5 20 10 C. 5 25 5 D. 5 25 10 E. 30 25 10

35. Consider the following code segment

```
int num = 1;
while (num < 5)
{
      System.out.print("A");
      num += 2;
}
```

A. A B. AA C. AAA D. AAAA E. AAAAA

36. Consider the following incomplete method, which is intended to return the number of integers that evenly divide the integer inputVal. Assume that inputVal is greater than 0.

```
public static int numDivisors(int inputVal)
{
  int count = 0;
  for (int k = 1; k <= inputVal; k++)
  {
    if ( /* condition */ )
    {
      count++;
    }
  }
  return count;
}
```

Which of the following can be used to replace / * condition * / so that numDivisors will work as intended?

A. inputVal % k == 0 B. k % inputVal == 0

C. inputVal % k != 0 D. inputVal / k == 0 E. k / inputVal > 0

37. Given the following call, what value would be returned for findTheMiddle(20221028)?

```
public static String findTheMiddle(int number)
{
    String stringNum = "" + number;
    int mid = stringNum.length()/2;

    if(stringNum.length() % 2 == 1)
    {
        return stringNum.substring(mid,mid+1);
    }
    else
    {
        return stringNum.substring(mid-1,mid+1);
    }
}
```

A. 2 B. 21 C.10 D. The code will error

38. How many times will the word "Heyo!" be printed in the following code segment?

```
int count = 2;
while(count <= 7)
{
    for(int i = 2; i < 5; i++)
    {
        System.out.println("Heyo!");
    }
    count ++;
}
```

A. 12 B. 15 C.18 D. 21

39. Consider the following code segment:

```
int num = 8;
for(int i = num; i > 0; i -= 3) //Line 2
{
    System.out.print(" " + i + " ");
}
```

Which of the following best explains how changing i > 0 to i >= 0 will change the result?

A. An additional value will be printed, as the for loop will iterate one additional time.

B. There will be no change in the program because the for loop will iterate the same number of times.

C. One fewer value will be printed, as the for loop will iterate one fewer time.

D. This program will result in an infinite loop, as the condition will never be false.

40. Which of the following code segments will print all multiples of 5 that are greater than 0 and less than 100?

```
I. for (int k = 1; k < 100; k++)
{
   if (k % 5 == 0)
   {
      System.out.print(k + " ");
   }
}

II. for (int k = 1; k < 100; k++)
{
   if (k / 5 == 0)
   {
      System.out.print(k + " ");
   }
}

III. int k = 5;
while (k < 100)
{
   System.out.print(k + " ");
   k = k + 5;
}
```

A. I only B. II only C. III only D. I and III E. II and III

41. Consider the following code segment.

```
for (int r = 3; r > 0; r--)
{
  int c;

  for (c = 1; c < r; c++)
  {
    System.out.print("-");
  }
  for (c = r ; c <= 3; c++)
  {
    System.out.print("*");
  }

  System.out.println();
}
```

A.
__*
_**
***

B.
*__
**_
***

C.
***
_**
__*

D.
***
**_
*__

42. Consider the following code segment:

```
for(int j = 0; j < 4; j++) //line 1
{
    for(int k = 0; k < j+1; k++)
    {
        System.out.print(k + "");
    }
}
```

Which of the following best explains the result of changing j < 4 to j > 4 on line 1?

A. The numbers will be printed in reverse order compared to the original because the outer loop will occur in reverse order.

B. The program will produce the same result, as the number of iterations in the outer loop hasn't changed.

C. An infinite loop will occur because the termination of the loop will never be reached.

D. No output will be produced, as the boolean condition will never be met in the outer for loop.

43. Consider the following method.

```
public void test(int x)
{
  int y;

  if (x % 2 == 0)
    y = 3;
  else if (x > 9)
    y = 5;
  else
    y = 1;

  System.out.println("y = " + y);
}
```

Which of the following test data sets would test each possible output for the method?

A. 8, 9, 12 B. 7, 9, 11 C. 8, 9, 11 D. 8, 11, 13 E. 7, 9, 10

44. Consider the following two code segments. Assume that the int variables **m** and **n** have been properly declared and initialized and are both greater than 0.

```
I.  for (int i = 0; i < m * n; i++)
    {
       System.out.print("A");
    }
II. for (int j = 1; j <= m; j++)
    {
       for (int k = 1; k < n; k++)
       {
          System.out.print("B");
       }
    }
```

Assume that the initial values of **m** and **n** are the same in code segment I as they are in code segment II. Which of the following correctly compares the number of times that "A" and "B" are printed when each code segment is executed?

A. "A" is printed **m** fewer times than "B". B. "A" is printed **n** fewer times than "B".

C. "A" is printed **m** more times than "B". D. "A" is printed **n** more times than "B".

45. What are the values of var1 and var2 after the following code segment is executed and the while loop finishes?

```
int var1 = 0;
int var2 = 2;

while ((var2 != 0) && ((var1 / var2) >= 0)) {
   var1 = var1 + 1;
   var2 = var2 - 1;
}
```

A. var1 = 0, var2 = 2

B. var1 = 1, var2 = 1

C. var1 = 3, var2 = -1

D. var1 = 2, var2 = 0

E. The loop won't finish executing because of a division by zero.