Note: Correct responses are based on Java, **J2sdk v 1.7.25**, from Sun Microsystems, Inc. All provided code segments are intended to be syntactically correct, unless otherwise stated (i. e. `error` is an answer choice) and any necessary Java 2 Standard Packages have been imported. Ignore any typographical errors and assume any undefined variables are defined as used. **For all output statements, assume that the System class has been statically imported…** ***import static java.lang.System.*;***

QUESTION 1

Which of these is NOT equivalent to $100010_2 + 100000_2$?

A. 66_{10} B. 112_8 C. 42_{16} D. 1000010_2 E. All are equivalent

QUESTION 2

What is output by the code to the right?

A. `5 19.0 3.8` B. `5 19.0 3`

C. `5.0 19.0 3.8` D. `5 19 4`

E. There is no output due to a compile error.

```
int w = 5;
double z = 19;
double q = z/w;
out.println(w+" "+z+" "+q);
```

QUESTION 3

What is output by the code to the right?

A. `falsefalsefalse` B. `truefalsefalse`

C. `truefalsetrue` D. `truetruetrue`

E. `truetruefalse`

```
Integer x = 5;
Integer y = x;
out.print(x==y);
y = 5;
out.print(x==y);
y = new Integer(5);
out.println(x==y);
```

QUESTION 4

What is output by the code to the right?

A. `5` B. `6 7 8`

C. `5 6 7 8` D. `5 6 7`

E. There is no output.

```
int x = 5;
while (x<=7)
  out.print(x+++" ");
```

QUESTION 5

What is output by the code to the right?

A. `1` B. `2` C. `5`

D. `8` E. `9`

```
String s = "bassGuitar";
out.println(s.lastIndexOf("a"));
```

QUESTION 6

What is output by the code to the right?

A. `5` B. `6` C. `9`

D. `10` E. `11`

```
int list[] = {1,3,5,2,4};
out.println(list[1]+list[3]);
```

QUESTION 7

For which initial values of p and q will this expression output `false`?

A. `true true` B. `true false`

C. `false true` D. `false false`

```
boolean p = <value1>,q = <value2>;
out.println(p||q);
```

QUESTION 8

What is output by the code to the right?

A. `00` B. `0`

C. `06` D. `66`

E. `60`

```
int z = 42;
if(z%7==0)
  out.print(z/7);
  out.println(z%7);
```

QUESTION 9

What is output by the code to the right?

A. `63 254` B. `254 63` C. `63 -2`

D. `508 31` E. `31 508`

```
int b = 127;
int c = 127;
out.println((b>>=2)+" "+(c<<=2));
```

QUESTION 10

What is output by the code to the right?

A. `-5.0` B. `-6.0`

C. `5.0` D. `6.0`

E. There is no output due to a compile error.

```
double f = -5.9423;
out.println(Math.floor(f));
```

QUESTION 11

Which statements would correctly replace <statement1> in the client code on the right to correctly modify the current Guitar object g into a 5 string bass guitar?

I. `g.getNumStrings(5);`
II. `g.setNumStrings(5);`
III. `g = new Guitar(5) ;`
IV. `g = new Guitar(5,"bass") ;`

A. I only

B. II only

C. III only

D. III and IV only

E. II, III, and IV only

QUESTION 12

Which statement would correctly replace `<statement2>` in the client code shown to output the type for the Guitar object g?

A. `out.println(g.getType());`

B. `out.println(g.setType("bass"));`

C. `out.println(g.getNumStrings());`

D. `out.println(g.setNumStrings(4));`

E. `out.println(g);`

QUESTION 13

Assuming the statements above have been correctly defined as described what is the output of the client code?

A. `4 string bass`

B. `5 string bass`

C. `bass: 4 string`

D. `bass: 5 string`

E. `6 string acoustic`

```
static class Guitar
{
  private String type;
  private int numStrings;
  public Guitar(){
     type = "acoustic";
     numStrings = 6;
  }
  public Guitar(int n){
     this();
     numStrings = n;
  }
  public Guitar(int n, String s){
     this(n);
     type = s;
  }
  public void setType(String s){
     type = s;
  }
  public String getType(){
     return type;
  }
  public void setNumStrings(int n){
     numStrings = n;
  }
  public int getNumStrings(){
     return numStrings;
  }
  public String toString()
  {
     return type+": "+numStrings+
     " string";
  }
////////////////////////////////
////client code
Guitar g = new Guitar(4,"bass");
<statement1>
<statement2>
out.println(g);
```

QUESTION 14

What is output by the code to the right?

A. `5` B. `5.6`

C. `7` D. `7.3`

E. `9`

```
out.printf("%.1f\n",3*4.2-7);
```

QUESTION 15

What is output by the code to the right?

A. `abcdef` B. `defabc`

C. `cbafed` D. `fedcba`

E. There is no output due to a compile error

```
static void showGrid(char[][]g){
 for(int r=g.length-1;r>=0;r--){
  for(int c=g[0].length-1;c>=0;c--)
   out.print(g[r][c]);
 }
}
//client code
char[][]g={{'a','b','c'},
           {'d','e','f'}};
showGrid(g);
```

QUESTION 16

For which of these input values will the output be 9?

A. `240` B. `100` C. `600`

D. `250` E. `260`

```
double d = <input>;
int x=0;
do{
   d/=2;
   x++;
}while(d>=1.0);
out.println(x);
```

QUESTION 17

What value is in position 4 after the client code to the right executes?

A. `6` B. `-1` C. `2`

D. `5` E. `4`

QUESTION 18

What is the greatest value in the list after the method call?

A. `0` B. `-1` C. `2`

D. `5` E. `4`

```
public static void Myst(int[]list){
  for(int j = 3;j<=5;j++)
     list[j]=list[j-2]-list[j-1];
}
//client code
int [] list = new int[6];
list[1]=5;
list[2]=2;
Myst(list);
```

QUESTION 19

Which of these choices could replace **<statement1>** to output the value 5?

I. substring(15)
II. substring(16)
III. substring(5,10)
IV. substring(7,12)
V. substring(10,16)

A. I only B. I, II, and III only

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

E. All will work correctly to output the value 5

```
String a = "012345678901234567890";
out.println(a.<statement1>.length());
```

QUESTION 20

What is output by the code to the right?

A. `000 010 101 110` B. `000 010 101 111`

C. `001 011 101 110` D. `001 010 100 111`

```
for(int p = 0; p <= 1; p++)
  for(int q = 0;q <= 1; q++)
     out.print(""+p+q+(p^q&p)+" ");
```

QUESTION 21

What is output by the code to the right?

A. `2.0` B. `3.0` C. `4.0`

D. `5.0` E. `6.0`

```
double y = 42;
y %= 13;
y = ++y;
out.println(y);
```

QUESTION 22

What is output by the code to the right?

A. `1010` B. `1100` C. `10`

D. `00001010` E. `1110`

```
String s=Integer.toBinaryString(10);
out.println(s);
```

QUESTION 23

What is output by the code to the right?

A. 64 B. 8 C. 4

D. 32 E. 16

```
out.println(Short.SIZE);
```

QUESTION 24

What is output by the code to the right?

A. -1.00 B. 0.00 C. 1.00

D. 2.72 E. 3.14

```
double d = Math.log(Math.E);
out.printf("%.2f",d);
```

QUESTION 25

Find f(6,5) according to the recursive function definition shown on the right. You may use the space below to do your work.

f(6,5) =

$$f(x,y) = \begin{cases} 2+f(x-3,y-1) & \text{when } x>y \text{ and } x>0 \\ 1+f(y,x) & \text{when } y>=x \text{ and } x>0 \\ 0 & \text{when } x<=0 \end{cases}$$

A. 8 B. 6 C. 5

D. 2 E. 3

QUESTION 26

What is output by the code to the right?

A. 32 B. 31

C. 1 D. 2

E. There is no output due to a compile error.

```
int x = -1>>>32;
String s = Integer.toBinaryString(x);
out.println(s.length());
```

QUESTION 27

What is output by the code to the right?

A. 3a B. 4a C. 4ade

D. 3vea E. 4IL

```
String s = "ILoveAParade";
String []a = s.split("[j-rM-Q]");
List<String> b = Arrays.asList(a);
out.println(b.size()+b.get(3));
```

QUESTION 28

What is output by the code to the right?

A. 34 114 B. 34 44

C. 44 54 D. 35 45

E. 34 54

```
Integer i = 34;
String s = i.toString();
int x = i;
String t = Integer.toString (x,5);
out.println(s+" "+t);
```

QUESTION 29

What is output by the code to the right?

A. winterwind winterwind

B. winterwind wimterwimd

C. suntersund sumtersumd

D. winterwind suntersund

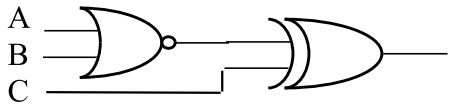
E. winterwimd sumtersumd

```
String w = "winterwind";
w.replaceAll("win","sun");
String s = w.replace('n','m');
out.println(w+" "+s);
```

QUESTION 30

Which of the following logical statements is represented by the digital electronics diagram on the right ?

A. A ^ B || C
B. !(A || B) ^ C
C. !(A ^ B) || C
D. A || B ^ C



QUESTION 31

There is possibly something wrong with the code on the right that would cause a compile error, or it could be just fine. Which answer choice best describes the situation ?

A. There is nothing wrong…the code is fine as is.
B. The abstract class methods should not have semicolons
C. The word `extends` should be `implements` instead
D. {} brackets are missing in the abstract class methods
E. The word `public` needs to precede each method definition.

```
abstract class A{
  abstract void A1();
  abstract int A2();
}

class B extends A{
  void A1(){}
  int A2(){return 0;}
}
//client code
A b = new B();
b.A1();
out.print(b.A2());
```

QUESTION 32

Assuming the code is updated so that method A1 outputs the phrase "`I made a `" and method A2 returns the value `240`, what is the output of the client code listed?

A. `0`
B. `240`
C. `I made a 240`
D. There is no output due to a compile error.
E. There is no output due to a runtime error.

QUESTION 33

What is output by the code to the right?

A. `3`
B. `7`
C. `9`
D. `5`
E. `6`

```
Queue<Integer> q = new
        LinkedList<Integer>();
q.add(3);q.add(5);q.add(9);
q.poll();q.add(6);q.poll();
q.poll();q.add(2);q.add(7);
out.println(q.peek());
```

QUESTION 34

Which of these is the least efficient O(N) rating?

A. O(N)
B. $O(N^2)$
C. O(log N)
D. O(N log N)
E. O(1)

QUESTION 35

What is output by the code to the right?

A. `16`
B. `15`
C. `14`
D. `13`
E. `12`

```
String ss="Now is the time for all"+
  " good men to come to the aid of"+
  " their country";
String [] a = ss.split(" ");
Set<String> s = new
   HashSet<String>(Arrays.asList(a));
out.println(s.size());
```

QUESTION 36

If A and B are Boolean values, which is the most simplified expression for A*B*A+0, where * means AND, + means OR, 0 means false, and 1 means true?

A. `0`
B. `1`
C. `A`
D. `A*A*B`
E. `A*B`

QUESTION 37

What bottom-left-corner to top-right-corner diagonal series of characters is produced by this code??

A. `abcde` B. `DEFGH`
C. `ABCDE` D. `defgh`
E. `01234`

```
for(int x=0;x<5;x++){
 for(int y=0;y<5;y++)
  out.print(((x+y)%5==4)
        ?(char)(y+100):'-');
  out.println();
}
```

QUESTION 38

What is output by the code to the right?

A. `45657` B. `4565` C. `5657`
D. `7565` E. `5654`

```
LinkedList<Integer>a = new
LinkedList<Integer>();
a.push(4); a.add(5);
a.offer(6);a.add(3,5);
a.offerLast(7);a.pollFirst();
Iterator<Integer> i =
    a.descendingIterator();
while(i.hasNext())
          out.print(i.next());
```

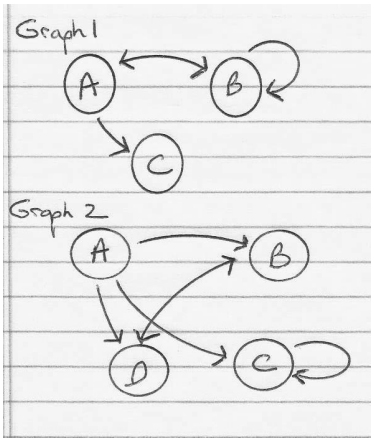
QUESTION 39

In graph 1 on the right, the adjacency matrix would look like this, where 1 means a one way connection and 0 would mean no connection:

	A	B	C
A	0	1	1
B	1	1	0
C	0	0	0

How many zeroes would be in the adjacency matrix for Graph 2?

A. `6` B. `10` C. `16`
D. `13` E. `3`



QUESTION 40

What is output by the code to the right?

A. `10 10` B. `10 20`
C. `10 25` D. `25 10`
E. `20 20`

```
static void p(int []a,int []b){
  a[0]=a[0]+b[0];
  b[0]=a[0]-b[0];
  a=b;
}
//client code
int [] x={10};
int [] y={5};
p(x,y);
p(y,x);
out.println(x[0]+" "+y[0]);
```