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 $202_{10} + 10000101_2$ ?

A. $335_{10}$　　　　B. $517_8$　　　　C. $14F_{16}$　　　　D. $101001011_2$　　　　E. All are

### QUESTION 2

What is output by the code segment to the right?

A. `4`　　B. `4.6`　　C. `18.2`　　D. `23.8`　　E. `24`

```
out.println(17 + 7 - 1 / 5);
```

### QUESTION 3

What is output by the code segment to the right?

A. `A60`　　B. `6560`　　C. `A1050`　　D. `651050`　　E. `125`

```
out.println("A" + 10 + 50);
```

### QUESTION 4

What is output by the code segment to the right?

A. `9`　　B. `10`　　C. `11`　　D. `18`　　E. `19`

```
String s = "abcabcabcabcabcabcabc";
out.println(s.lastIndexOf("abc",10));
```

### QUESTION 5

What is output by the code segment to the right?

A. `false`　　B. `true`

```
boolean p = true;
boolean q = true;
out.println(!p&&q);
```

### QUESTION 6

What is output by the code segment to the right?

A. `4`　　B. `4.0`　　C. `8`　　D. `8.0`　　E. `16`

```
int x = 64;
out.println(Math.cbrt(x));
```

### QUESTION 7

What is output by the code segment to the right?

A. `-2.5`　　B. `2.5`　　C. `15.7`　　D. `-15.7`
E. There is no output due to an error.

```
long j = -55;
double d = -3.5;
out.println(j%d);
```

### QUESTION 8

For which of these input values will the output of the code segment to the right be "yes"?

I　9
II　10
III　11
IV　19
V　21

A. I only　　　　B. V only　　　C. I and V only

D. II, III, and IV only　　　　E. I, II, III, IV, and V

```
int x = <input value>;
if(!(x>20||x<10))
  out.println("yes");
else
   out.println("no");
```

### QUESTION 9

How many stars will be output by the code segment to the right?

A. `3`　　B. `4`　　C. `5`　　D. `6`　　E. `7`

```
int x = 4;
String s = "";
do{
  s+="*";
  x+=2;
}while(x%7!=0);
out.println(s);
```

| QUESTION 10 | |
|---|---|
| What is output by the code segment to the right?<br><br>A. `10`  B. `106`  C. `138`  D. `202`  E. `250` | ```java<br>char[]list=new char[5];<br>list[1]='1';<br>list[2]='2';<br>list[3]=3;<br>list[4]=4;<br>out.println(list[0]+list[1]+list[2]+list[3]+list[4]);<br>``` |

| QUESTION 11 | |
|---|---|
| In the code segment to the right, which statement below must be placed in **\<code block\>** in order for this code segment to work properly?<br><br>A. `import java.io.*;`<br>B. `import java.util.*;`<br>C. `import static java.lang.System.*;`<br>D. `import static java.lang.Math.*;`<br>E. More than one of these. | ```java<br><code block><br>public class test{<br>  public static void main<br>                  (String [] args){<br>    Scanner kb = new<br>          Scanner(System.in);<br>  }<br>}<br>``` |

| QUESTION 12 | |
|---|---|
| What is output by the code segment to the right?<br><br>A. `10 55`  B. `10 45`  C. `11 45`<br>D. `11 55`  E. None of these | ```java<br>int x = 100;<br>int y = 1;<br>for(;y<10;y++)<br>  x-=y;<br>out.println(y+" "+x);<br>``` |

| QUESTION 13 | |
|---|---|
| Here are three lines taken from the Java Order of Precedence chart. Which choice represents the correct order of precedence for these three lines?<br><br>A. I, II, III      B. III, II, I      C. II, I, III<br>D. I, III, II      E. III, I, II | I. `^`<br>II. `\|\|`<br>III. `? :` |

| QUESTION 14 | |
|---|---|
| What is output by the code segment to the right?<br>A. `8`  B. `16`  C. `32`  D. `64`  E. None of these | ```java<br>out.println(Character.SIZE);<br>``` |

| QUESTION 15 | |
|---|---|
| What is output by the code segment to the right?<br><br>A. `false false`      B. `false true`  C. `true false`<br>D. `true true`          E. There is no output due to an error. | ```java<br>int [] pList = {10,20,30,40,50};<br>ArrayList<Integer> aList = new<br>   ArrayList<Integer>();<br>for(int a:pList)<br>   aList.add(a/10);<br>out.print(pList.contains(30)+ " ");<br>out.println(aList.contains(30));<br>``` |

| QUESTION 16 | |
|---|---|
| How many ordered pairs make this boolean expression false?<br><br>A. 0          B. 1          C. 2          D. 3          E. 4 | $$\overline{\overline{A}+B}$$ |

| QUESTION 17 | |
|---|---|
| What is output by the code to the right?<br><br>A. `7`  B. `7.0`  C. `17`  D. `17.0`<br><br>E. There is no output due to an error. | ```java<br>long j = 20;<br>int k = -15;<br>double p = 5;<br>out.println(j+k/p);<br>``` |

| QUESTION 18 | |
|---|---|
| What is output by the code segment to the right?<br><br>A. `3`  B. `4`  C. `5`  D. `6`  E. `7` | ```java<br>int [][] grid = new int[5][4];<br>for(int r=1;r<grid.length;r++)<br>  for(int c=0;c<grid[r].length;c++)<br>   grid[r][c] = r+c;<br>out.println(grid[3][2]);<br>``` |

| QUESTION 19 | |
|---|---|
| Which of the following choices represents the decimal equivalent of the two's complement binary value 11001010?<br><br>A. -51          B. -52          C. -53          D. -54          E. -55 | |

## QUESTION 20

What is the output at the end of the third iteration in the method execution called by the client code to the right?

A. 8 4 2 7 6    B. 2 4 8 7 6    C. 8 7 4 2 6
D. 2 4 7 8 6    E. 8 7 6 4 2

## QUESTION 21

What algorithm is represented by the method `mystD1`?

A. Insertion sort   B. Selection sort   C. Bubble sort

D. Merge sort     E. Quick sort

## QUESTION 22

In which line of this method must a change be made so that the sorting order is reversed?

A. Line 2  B. Line 4  C. Line 5  D. Line 6  E. Line 8

## QUESTION 23

What is the least restrictive order of magnitude for the average case in the sort shown in the code to the right?

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

```java
1 public static void mystD1(int[] list){
2   for (int j = 1; j < list.length; j++){
3     int temp = list[j];
4     int i = j;
5     while (i > 0 && temp > list[i - 1]){
6       list[i] = list[i - 1];
7       i--;
      }
8     list[i] = temp;
9   for(int x:list)
10      out.print(x+" ");
11    out.println();
    }
```

```
<client code>
int [] list = {8,2,4,7,6};
mystD1(list);
```

## QUESTION 24

What is the output of the code segment to the right?

A.
```
43210
6543210
10
3210
543210
```
B.
```
3210
543210
0
210
43210
```
C.
```
EEEEE
GGGGGGG
BB
DDDD
FFFFFF
```
D.
```
EEEE
GGGGGG
B
DDD
FFFFF
```
E.
There is no output due to an error.

```java
String s = "EGBDF";
char [] list = s.toCharArray();
for(char a:list){
  int x = a-64;
  while(x-->0)
    out.print(a);
  out.println();
}
```

## QUESTION 25

What is output by the code segment to the right?

A. 30.0    B. 45.0    C. 60.0    D. 90.0    E. None of these

```java
double val = 0.5;
out.printf("%.1f\n",
   Math.toDegrees(Math.acos(val)));
```

## QUESTION 26

What is output by the code segment to the right?

A. 1.23.456.095.4
B. 1.2 3.45 6.09 5.4
C. [1.2 3.45 6.09 5.4]
D. [1.2, 3.45, 6.09, 5.4]
E. There is no output due to an error

```java
double [] list = {1.2,3.45,6.09,5.4};
out.println(Arrays.toString(list));
```

## QUESTION 27

Which choice below represents the two terms listed in order to correctly replace <thing1> and <thing2> in the method definition to the right?

A. `int` and `return`　　　B. `return` and `int`

C. `public` and `return`　　D. `public` and `int`

E. `return` and `public`

## QUESTION 28

Assuming <thing1> and <thing2> have been correctly replaced, what is the output of the client code to the right?

A. `1 0`　　B. `1 40`　　C. `45 0`　　D. `9 8`　　E. `9 40`

```
static <thing1> mystD1 (int x){
  if(x%4==0)
     <thing2> x*5;
  <thing2> x;
}

<client code>
out.print(mystD1(9)+ " ");
out.println(mystD1(8));
```

## QUESTION 29

In the Dwelling class definition to the right, how many instance fields are there?

A. 1　　　B. 2　　　C. 3　　　D. 4　　　E. 5

## QUESTION 30

Using the Dwelling class definition to the right, with the block comment symbols (`/* */`) in place as shown, what is the output of the client code below?

```
Dwelling d = new Dwelling();
out.println(d);
```

A. `null 0 false`
B. `Dwelling@150bd4d`
C. `null 0 rooms not sturdy`
D. `: 0 rooms: not sturdy`
E. `null: 0 rooms: not sturdy`

## QUESTION 31

If the block comment symbols are removed in the Dwelling class definition to the right, what is the output of the client code below?

```
Dwelling d = new Dwelling();
out.println(d);
d = new Dwelling("tent",2,false);
out.println(d);
```

A.
```
house: 3 rooms: sturdy
tent: 2 rooms: not sturdy
```
B.
```
Dwelling@150bd4d
Dwelling@1bc4459
```
C.
```
house: 3: true
tent: 2: false
```
D.
```
house: 3 rooms: true
tent: 2 rooms: false
```
E.
There is no output due to an error.

```
class Dwelling{
  private String type;
  private int numRooms;
  private boolean sturdy;
/*
  public Dwelling(){
     type = "house";
     numRooms = 3;
     sturdy = true;
  }
  public Dwelling(String ty, int nr,
              boolean st){
     type = ty;
     numRooms = nr;
     sturdy = st;
  }
*/
  public String toString(){
     return type+": "+numRooms
        +" rooms: " +
        (sturdy?"sturdy":"not sturdy");
  }}
```

What is output by the code to the right?

A. 2    B. 2.5    C. 22    D. 60

E. There is no output due to an error

```
out.println(Integer.toString(12,5));
```

Using the generic stack pseudocode on the right, what is the sum of all popped items after the push and pop sequence is complete?
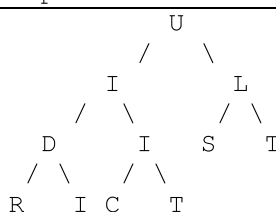
A. 14    B. 17    C. 18    D. 22    E. 25

```
Push 3
Push 9
Push 6
Push 4
Pop x
Pop x
Push 5
Pop x
Push 3
Pop x
```

What is the preorder traversal of the binary tree shown to the right?

A. UIDRIICTLST    B. RDIICITUSLT    C. RIDCTIISTLU

D. UILDISTRICT    E. ULTSIITCDIR
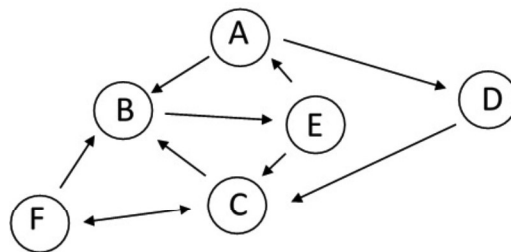
```
            U
          /   \
       I          L
      / \        / \
    D     I     S    T
   / \   / \
  R   I C   T
```

Which of the following is **NOT** a simple path in the graph shown to the right?

I. ABEC
II.    EABEC
III.    DCBEA
IV.    DCBF
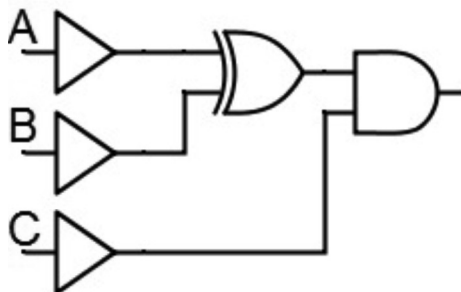
A. I only   B. II only   C. IV only   D. I and III only   E. II and IV only

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

A.    $\overline{A \oplus B} * C$
B.    $A \oplus B * C$
C.    $(A + B) * C$
D.    $(A \oplus B) * C$
E. None of these

Which of the expressions below is the postfix equivalent to the expression shown?

A. - + I / N ^ T E L
B. I N T E ^ / - L +
C. I N T E ^ / L + -
D. - I + / N ^ T E L
E. None of these

I + N / T ^ E - L

## QUESTION 38

Which of the following values is NOT a possible outcome of the code shown to the right?

A. 33    B. 35    C. 36    D. 37    E. 38

```
Random r = new Random();
out.print(r.nextInt(5)+33);
```

## QUESTION 39

**Free Response Question:**

Simplify the Boolean Algebra expression shown below as much as possible.

$$\overline{A * B + \overline{A} + \overline{B}}$$

## QUESTION 40

**Free Response Question:**

Find f(5) according to the recursive function definition shown below.

f(5) =

```
            f(x-3)+1    when x>0
f(x)=       3           when x=0
            2           when x<0
```