Note: Correct responses are based on Java, J2sdk v 5.0, 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.

QUESTION 1

Which of the choices below has the smallest value in base 10?

A. 52_{16} B. 124_8 C. 146_7 D. 83_{10} E. 1010001_2

QUESTION 2

What is output by the code to the right?

A. 5   B. 6   C. 25   D. 36   E. 7

```
int x = 5;
System.out.println( ++x );
```

QUESTION 3

What is output by the code to the right?

A. 57911   B. 579

C. 79   D. 7911

E. 57

```
int y = 5;
do{
   y+=2;
   System.out.print(y);
}
while(y<10);
```

QUESTION 4

What is output by the code to the right?

A. s   B. r   C. lowers   D. flower   E. a

```
String s = "flowers";
char a=s.charAt(6);
System.out.println(a);
```

QUESTION 5

What is output by the code to the right?

A. 6   B. 2   C. 3   D. 5   E. 11.6

```
double [] list = {4.6,9.7,11.6};
System.out.println(list.length);
```

QUESTION 6

What is output by the code to the right?

A. true   B. false   C. b   D. !b   E. yes

```
boolean b = true;
System.out.print(b|!b);
```

QUESTION 7

What is output by the code to the right?

A. dogcat   B. false

C. true   D. cat

E. dog

```
if("cat"=="cat")
   System.out.print("dog");
else
   System.out.print("cat");
```

QUESTION 8

Which of the following choices will NOT correctly instantiate an Integer object?

A. `Integer i = new Integer(4);`

B. `Integer k = new Integer("4");`

C. `Integer j = 4;`

D. `Integer l = new Integer(Integer.parseInt("4"));`

E. All of these will work correctly.

QUESTION 9

What is output by the code to the right?

A. 17   B. 20   C. 28   D. 12   E. 35

```
System.out.println(20 & 17 | 12);
```

QUESTION 10

What is output by the code to the right?

A. -4.0   B. -5.0   C. -4.3   D. -4.2   E. -4.4

```
System.out.print(Math.ceil(-4.3));
```

QUESTION 11

What is output by the code below?

```
System.out.println("....*....*....*");
System.out.println(String.format("%03d %-5.3f%2s^",4,4.4,"4"));
```

A. ....*....*....*
   4 4.4004 ^
B. ....*....*....*
   004 4.400 4^
C. ....*....*....*
   004 4.4004 ^
D. ....*....*....*
   4 4.400 4^
E. ....*....*....*
   0004 4.400 4^

QUESTION 12

What is output by the code to the right?

A. e

B. ae

C. eio

D. eiou

E. eiouy

```
char c = 'e';
String ss="";
switch(c)
{
  case 'a':ss+='a';
  case 'e':ss+='e';
  case 'i':ss+='i';
  case 'o':ss+='o';
  case 'u':ss+='u';
  default: ss+='y';
}
System.out.print(ss);
```

QUESTION 13

What is output by the code to the right?

A. -1   B. 1   C. 3   D. -3   E. false

```
String s1 = "aardvark";
String s2 = "advantage";
System.out.println(s2.compareTo(s1));
```

QUESTION 14

What is output by the code to the right?

A. th

B. r

C. t

D. There is no output due to a run-time error

E. There is no output due to a syntax error

```
String s3 = "Hello out there!";
out.println(s3.split("[aeiou ]+")[3]);
```

QUESTION 15

What is output by the code to the right?

A. 4.5

B. 5

C. 4

D. There is no output due to a run-time error

E. There is no output due to a syntax error

```
Double dbl = Double.parseDouble("4.5");
Integer i1 = (int)(double)dbl;
System.out.println(i1);
```

QUESTION 16

What is output by the code to the right?

A. 32

B. 16

C. 64

D. 4

E. 8

```
System.out.println(Double.SIZE);
```

QUESTION 17

What is output by the code to the right?

A. 4

B. (4)

C. [4]

D. true

E. false

```
List a1 = new LinkedList();
System.out.print(a1.add(4));
```

QUESTION 18

What is output by the code to the right?

A. 6

B. 5025126310

C. 1005025126310

D. 100502512631

E. 7

```
int yy=100;
String zz = "";
while(yy>0)
{
  zz+=yy;
  yy/=2;
}
System.out.println(zz);
```

QUESTION 19

What is output by the code to the right?

A. 1

B. 49

C. 33

D. 98

E. output cannot be determined

```
Character s19 = '1';
System.out.println(s19.hashCode());
```

QUESTION 20

Which of the following could replace **`<*1>`** in the code to the right to output the value representing the number of elements in `list1`?

A. `list1.length()`   B. `list1.length`

C. `list1.size`   D. `list1.size()`

E. `list1.SIZE`

QUESTION 21

Which of the following could replace **`<*1>`** in the code to the right to output the value representing the number of elements in `list2`?

A. `list2.length()`   B. `list2.length`

C. `list2.size`   D. `list2.size()`

E. `list2.SIZE`

QUESTION 22

Which of the following could replace **`<*1>`** in the code to the right to output the value `6` contained in `list2`?

A. `list2[3]`   B. `list2[4]`

C. `list2.get(3)`   D. `list2.get(4)`

E. `list2.get[4]`

```
//Use the statements listed below for questions 20 - 22

Integer[] list1 = {3,4,5,6,7};
List<Integer>list2;
list2 = Arrays.asList(list1);

System.out.println( <*1> );
```

QUESTION 23

What is output by the code to the right?

A. `truefalsefalse`   B. `falsetruefalse`

C. `truefalsetrue`   D. `truetruetrue`

E. `falsefalsetrue`

```
String s23 = "4";
System.out.print(s23.matches("\\d"));
System.out.print(s23.matches("\\D"));
System.out.print(s23.matches("\\w"));
```

QUESTION 24

What is output by the code below?

```
    boolean p=false, q=false, r=false, flag=false;
    for(int a=0; a<=1; a++)
    {
     for(int b=0; b<=1; b++)
     {
       for(int c=0; c<=1; c++)
       {
           flag = (p && (!q || r) || !p && !q &&(p || !q) && r);
           System.out.print("" + a + b + c + "" + flag + " ");
           r = !r;
       }
       q = !q;
     }
     p = !p;
    }
```

A. `000false 001true 010false 011false 100true 101true 110false 111false`

B. `000false 001true 010false 011true 100true 101true 110false 111true`

C. `000true 001true 010false 011false 100true 101true 110false 111true`

D. `000false 001true 010false 011false 100true 101true 110false 111true`

E. `000true 001true 010false 011true 100true 101true 110false 111true`

QUESTION 25

What is output by the line marked `//1` in the client code to the right?

A. `hello 5 3.14 a true`

B. `hello 5 3.14 @ true`

C. `hello 12 3.14 a true`

D. `goodbye 12 0.0 @ true`

E. `goodbye 12 0.0 @ false`

QUESTION 26

What is output by the line marked `//2` in the client code to the right?

A. `hello 5 3.14 a true`

B. `hello 5 3.14 @ true`

C. `hello 12 3.14 a true`

D. `goodbye 12 0.0 @ true`

E. `goodbye 12 0.0 @ false`

```
//Use the statements listed below for questions 25 and 26

public class Sample
{
  private String str;
  public int i;
  private double dec;
  private char c;
  private boolean boo;

  public Sample(){
    this("hello",5);
    dec=3.14;
    c='a';
    boo=true;
  }

  public Sample(String s,int x){
    str=s;
    i=x;
    c='@';
  }

  public String toString(){
    return (str+" "+i+" "+dec+" "
        +c+" "+boo);
  }
}

/////////////////////////////////////////
//client code
Sample s25 = new Sample();
System.out.println(s25);          //1
Sample s26 = new Sample("goodbye",12);
System.out.println(s26);          //2
```

QUESTION 27

What is output by the statement below?

    System.out.println(f(10));

A. `-2.0`   B. `2.0`   C. `3.0`   D. `-3.0`   E. `7.0`

QUESTION 28

What is output by the statement below?

    System.out.println(f(f(f(f(10)))));

A. `-2.0`   B. `2.0`   C. `3.0`   D. `-3.0`   E. `7.0`

```
public static double f(double x)
{
  if(x>=5)
    return f(x-2)-x/2;
  if(2<x&&x<5)
    return x+f(x-1);
  return Math.pow(x,2)-1;
}
```

QUESTION 29

Which of the following could replace `<*1>` in the code to the right to correctly complete the statement?

A. `int`

B. `Integer`

C. `byte`

D. `long`

E. `double`

```
Object z;

z = new <*1>(Math.round(25.4f));
```

QUESTION 30

What is output by the line marked `//1` in the code to the right?

A. `543`

B. `[5, 4, 3]`

C. `cowhorsepig`

D. `[cow, horse, pig]`

E. Exact output cannot be determined

QUESTION 31

What is output by the line marked `//2` in the code to the right?

A. `543`

B. `[5, 4, 3]`

C. `cowhorsepig`

D. `[cow, horse, pig]`

E. Exact output cannot be determined

```
//use the following code for questions 30 and 31

Map <String,Integer> m;
m = new TreeMap<String,Integer>();
m.put("horse",4);
m.put("cow",5);
m.put("pig",3);

Set <String> set = m.keySet();
out.println(set);    //1

Iterator iter = set.iterator();
while(iter.hasNext())  //2
  out.print(m.get(iter.next()));
```

QUESTION 32

What is output by the code to the right?

A. 7

B. 6

C. 5

D. 3

E. 1

```
int cc=0;
for(int jj=11;jj<=100;jj+=2)
{
  int t=jj/10;
  int u=jj-t*10;
  if((t+u)/3==(t+u)/3.0
    &&(t>u)
    &&(u==3||t==5)
    &&(u*t>21)
    )
    cc++;
}
System.out.println(cc);
```

QUESTION 33

What is output by the code to the right?

A. 37

B. 11

C. 36

D. 10

E. 1

```
out.println(Integer.toString(37,36));
```

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QUESTION 34

What is output by the line marked //1 in the client to the right?

A. 3 2 4 5 1 0 1 3 2 6 1 2 1 3 4

B. 4 1 2 6 2 0 2 4 1 3 2 2 1 4 2

C. 3 2 4 5 1 1 0 3 2 6 1 2 1 3 4

D. 4 1 2 6 2 0 2 4 1 3 2 1 2 4 2

E. 3 2 4 5 1 0 1 3 2 6 1 2 1 3 5

QUESTION 35

What is output by the line marked //2 in the client to the right?

A. 3 2 4 5 1 0 1 3 2 6 1 2 1 3 4

B. 4 1 2 6 2 0 2 4 1 3 2 2 1 4 2

C. 3 2 4 5 1 1 0 3 2 6 1 2 1 3 4

D. 4 1 2 6 2 0 2 4 1 3 2 1 2 4 2

E. 3 2 4 5 1 0 1 3 2 6 1 2 1 3 5

QUESTION 36

What is output by the line marked //3 in the client to the right?

A. 8

B. 7

C. 4

D. 5

E. 6

```
//use the following  code for questions 34-36

public static int myst(int [][] list)
{
  int s=0;
  for(int i=0;i<list.length;i++)
  {
    for(int j=0;j<list[0].length;j++)
    {
      if(list[i][j]/2==list[i][j]/2.0)
        list[i][j]=list[i][j]/2;
      else
        list[i][j]=list[i][j]+1;
    }
  }

  for(int i=0;i<list.length;i+=2)
  {
    for(int j=1;j<list[0].length;j+=3)
      s+=list[i][j];
  }

  dis(list);     //2
  return s;
}


public static void dis(int [][]list)
{
  for(int i=0;i<list.length;i++)
  {
    for(int j=0;j<list[0].length;j++)
      System.out.print(list[i][j]+" ");
  }
  System.out.println();
}


/////////////////////////////////////////
//client code

int[][]nums={{3,2,4,5,1},
             {0,1,3,2,6},
             {1,2,1,3,4}};

dis(nums);         //1

System.out.println(myst(nums));    //3
```

```
//Use the code below for questions 37-40

public class Sort
{
  private int [] numbers = {4,2,7,5,1};

  public void sort()
  {
    int length = numbers.length;
    for(int g = 1; g < length; g++)
    {
      int index = numbers[g];
      int h = g;
      while(h>0 && numbers[h-1]<index)
      {
        numbers[h] = numbers[h-1];
        h = h - 1;
      }
      numbers[h] = index;
    }
  }

  public void display()
  {
    for(int i:numbers)
      System.out.print(i+" ");
    System.out.println();
  }
}

/////////////////////////////////////////
//client code
Sort test = new Sort();
test.display();
test.sort();
test.display();
```

QUESTION 37

What is output by the client code to the right?

A. 4 2 7 5 1
   7 5 4 2 1

B. 1 5 7 2 4
   4 2 7 5 1

C. 4 2 7 5 1
   1 2 4 5 7

D. 1 5 7 2 4
   1 2 4 5 7

E. 4 2 7 5 1
   2 4 5 7 1

QUESTION 38

Which change listed below will reverse the final sorted order of method sort()?

A. Change "g < length"
      to "g > length"

B. Change "h > 0"
      to "h < 0"

C. Change "numbers[h-1] < index"
      to "numbers[h-1] > index"

D. Change "numbers[h] = numbers[h-1];"
      to "numbers[h] = numbers[h+1];"

E. Change "h = h - 1;"
      to "h = h + 1;"

QUESTION 39

What standard sorting routine is method sort()?

A. bubble
B. selection
C. insertion
D. quick
E. merge

QUESTION 40

What is the expected running time of method sort() if the array contains a random number of elements in random order? Choose the most restrictive answer.

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