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 $74_{16} + 1101010_2$?

A. 11011110_2 B. 336_8 C. 220_{10} D. DE_{16} E. All are equivalent

QUESTION 2

What is the result of the expression shown?

A. 43 B. 91 C. 9 D. 25 E. 0

```
out.println(21 / 3 * 5 + 8);
```

QUESTION 3

In an output statement such as the one shown below, which choice below correctly labels each part of the statement?

`System.out.println("Hello");`

A. `System`-object, `out`-class, `println`-method, `"Hello"`-parameter
B. `System`-class, `out`-method, `println`-object, `"Hello"`-parameter
C. `System`-class, `out`-object, `println`-parameter, `"Hello"`-method
D. `System`-class, `out`-object, `println`-method, `"Hello"`-parameter
E. `System`-parameter, `out`-object, `println`-method, `"Hello"`-class

QUESTION 4

What is output by the code segment below?

```
String s = "Sara's seven sisters slept soundly in sand.";
out.println(s.replace("s","th"));
```

A. `Sara'th seven sisters slept soundly in sand.`
B. `Thara's theven thithterth thlept thoundly in thand.`
C. `Thara's seven sisters slept soundly in sand.`
D. `Sara'th theven thithterth thlept thoundly in thand.`
E. There is no output due to an error.

QUESTION 5

What is output by the code segment to the right?

A. `false` B. `true`

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

QUESTION 6

What is output by the code segment to the right?

A. 3 B. 3.0 C. 1.5 D. 2.0
E. There is no output due to an error.

```
int x = 1000;
out.println(Math.log10(x));
```

QUESTION 7

What is output by the code to the right?

A. 66.7 B. 66 C. 34.7 D. B
E. There is no output due to an error.

```
float f = 33.3f;
char a = 'd';
out.println(a - f);
```

QUESTION 8

What is output by the code to the right?

A. 6
B. 18
C. 60
D. 48
E. 160

```
int a = 0;
for(int x=0;x<10;x++){
      switch(x%5) {
            case 0: a++;break;
            case 1: a-=2;
            case 2: a+=5;break;
            case 3: a--;
            default: a=a+a;
      }
}
out.println(a);
```

QUESTION 9

What is output by the code to the right?

A. 10 B. 8 C. 6
D. There no output due to an infinite loop
E. There no output due to an error

```
int a = 100;
while(a>10) a/=1.5;
out.println(a);
```

QUESTION 10

Which of the original elements of the array shown to the right is no longer in the array after execution of the code?

A. 1 B. 2 C. 3 D. 4 E. 5

```
int [] list = {5,3,1,4,2};
list[3] = list[list[2]];
list[list[2]] = list[4];
```

QUESTION 11

Which of the statements below will NOT work properly when inserted into the code to the right?

I. `k.next().charAt(4);`
II. `k.nextChar(4);`
III. `k.nextLine().charAt(4);`

A. I only B. II only C. III only
D. I and III only E. All will work properly

```
String s = "grandbaby";
Scanner k = new Scanner(s);
char d = <statement>
```

QUESTION 12

What is output by the code segment to the right?

A. 10 4
B. 10 5
C. 11 3
D. 11 4
E. 9 6

```
String t = "";
String s = "state of texas";
do{
 int x = s.length()/2;
 t+=s.substring(x,x+1);
 s=s.substring(0,x)+s.substring(x+1);
}while(t.length()<10);
out.println(t.length()
      + " "+s.length());
```

QUESTION 13

What is output by the code segment to the right?

A. 4 B. 10 C. 20 D. 10true E. 20false

```
int x=2,y=5,z=7;
x+=x*y&z;
out.println(x);
```

QUESTION 14

What is output by the code segment to the right?

A. truetruetruetrue
B. truefalsetruefalse
C. truetruefalsefalse
D. truefalsefalsefalse
E. falsefalsefalsefalse

```
Integer x = 100;
Integer y = 100;
Integer z = new Integer(100);
out.print(x==y);
out.print(x==z);
x+=30;
y+=30;
out.print(x==y);
out.println(x==z);
```

QUESTION 15

What is output by the code segment to the right?

A. `[2, 5]` B. `[3, 5, 7]`
C. `[5, 7, 2]` D. `[3, 5, 7, 2]`
E. There is no output due to an error.

```
int [] list={9,3,5,7,2,4,1,6};
ArrayList<Integer> aList = new
ArrayList<Integer>();
for(int x:list)   aList.add(x);
out.println(aList.subList(2,5));
```

QUESTION 16

Which of the choices below shows the correct order of values to fill the blanks in the code to the right so that the output value is true?

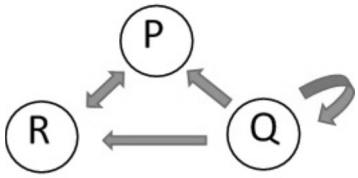
A. `1 3 6` B. `1 6 3` C. `3 1 6`
D. `3 6 1` E. `6 1 3`

```
String s = "animaniacs";
String t = "amaniacal";
out.println(s.regionMatches
              (___,t,___,___));
```

QUESTION 17

For the graph shown to the right, how many zeroes are in the adjacency matrix?

A. 2 B. 3 C. 4 D. 5 E. 6



QUESTION 18

What is output by the code to the right?

A. `240` B. `255` C. `00000000`
D. `11110000` E. `11111111`

```
int x = 15, y = 4;
String s;
S = Integer.toBinaryString(x<<y);
out.println(s);
```

QUESTION 19

How many ordered triples make this boolean expression false?

A. 2 B. 3 C. 4 D. 5 E. 6

$$(A + B) * (\bar{A} + \bar{C})$$

QUESTION 20

Which choice below represents the ordered pair of values that would correctly fill in the blanks in the code to the right to generate a random integer in the range of 27 to 56, inclusive?

A. `27 29` B. `27 56` C. `29 28`
D. `29 30` E. `30 27`

```
Random r = new Random();
out.println(r.nextInt(___)+___);
```

QUESTION 21

Which of the following choices is NOT true about the Java PriorityQueue class?

A. Based on a heap data structure
B. Allows insertion of null elements
C. Head of the queue is the least object
D. Dynamic, able to grow and shrink as needed
E. Uses natural order of objects based on Comparable interface

QUESTION 22

Which of the following choices will correctly instantiate a new static two-dimensional array of doubles as shown below?

```
1.2 3.4
5.6 7.8 9.0
8.7 6.5
4.3
```

A. `double [] dubs = {1.2 3.4 5.6 7.8 9.0 8.7 6.5 4.3};`
B. `double [] dubs = {1.2, 3.4, 5.6, 7.8, 9.0, 8.7, 6.5, 4.3};`
C. `double [][] dubs = {1.2, 3.4}, {5.6, 7.8, 9.0}, {8.7, 6.5}, {4.3};`
D. `double [][] dubs = {{1.2, 3.4}, {5.6, 7.8, 9.0}, {8.7, 6.5}, {4.3}};`
E. All will work properly

QUESTION 23

Which of these descriptions regarding the least restrictive running times of TreeMap and HashMap methods is NOT correct?

A. HashMap get - constant time
B. HashMap put - constant time
C. TreeMap get - log(n) time
D. TreeMap put - log(n) time
E. All are correct

QUESTION 24

Which of the expressions below is NOT equivalent to the expression shown on the right?

$$\overline{(\bar{A} * B) * \overline{(A + \bar{B})}}$$

A. $\overline{(\bar{A} * B)} + \overline{(A + \bar{B})}$

B. $(\bar{A} + \bar{B}) + (A + \bar{B})$

C. $A + \bar{B}$

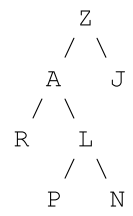
D. $\overline{(\bar{A} * B)} + (A + \bar{B})$

E. $\overline{(\bar{A} + \bar{B})} + (A + \bar{B})$

QUESTION 25

Each of four choices below matches one of the following traversals of the tree shown to the right: inorder, preorder, postorder, reverse order. Which choice does not match any of these traversals?

A. JZNLPAR B. ZAJRLPN C. ZARLPNJ
D. RAPLNZJ E. RPNLAJZ



QUESTION 26

What is output by the code segment to the right?

A. 8.1341 B. 8.135
C. 43.1 D. 53.1341
E. 91.1

```
int x = 5;
char a = '1';
String s = "34";
double d = 3.1;
out.println(x+d+s+a);
```

QUESTION 27

Which choice below correctly replaces <blank> in the code to the right?

A. String B. int C. char
D. double E. void

```
static <blank> mystR15(int x,int y){
  return Math.sqrt(x)+Math.cbrt(y);
}
//client code
out.println(mystR15(121,343));
```

QUESTION 28

Assuming the <blank> in the method to the right has been replaced correctly, what is output by the client code to the right?

A. 18 B. 18.0 C. 117
D. 117.0 E. There is no output due to an error.

QUESTION 29

Question omitted

QUESTION 30

Regarding the code to the right, which statement below best describes the implementation of class Two?

A. Class Two must implement the `alpha()` method.
B. Class Two must override the `beta()` method.
C. Class Two must implement `alpha()` and override `beta()`
D. Class Two is not required to do anything special.
E. This class structure is invalid due to an error in the code.

QUESTION 31

Assuming all is well with this class structure with any possible error having been corrected, and the alpha method having been defined to return the value 9, what is the output for the client code to the right?

A. `1.09B`
B. `1.0966`
C. `10.0B`
D. `76.0`
E. There is no output due to an error.

QUESTION 32

Which choice below is NOT be a valid set of statements for the implementation of Class Two in the code to the right?

A.
```
int alpha(){return 9;}
```

B.
```
String beta(){return "B";}
```

C.
```
int alpha(){return 9;}
String beta(){return "B";}
```

D.
```
int alpha(){return 10;}
String beta(){return "C";}
```

E. More than one of these is invalid.

```
abstract class One{
 double d = 1.0;
 abstract int alpha();
 String beta(){return "B";}
}
class Two extends One{
//    <implementation>
}
//client code
Two fer = new Two();
out.println(fer.d+fer.alpha()
           +fer.beta());
```

QUESTION 33

Which of the following choices best describes the quick sort algorithm?

A. Relies on a partition operation in which a pivot value is selected, and all elements smaller than the pivot are moved before it and all greater elements are moved after it.

B. Continuously divides a list into halves until each half is only one element, and then builds the halves back in sorted order until the entire list is sorted.

C. Works by taking elements from the list one by one and placing them in their correct position into a new sorted list.

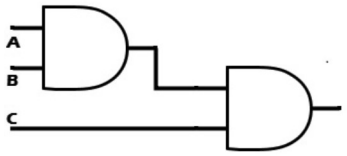
D. Starts at the beginning of the array and finds the best value for each position, swaps it with the value in the current position, and repeats these steps for the remainder of the list.

E. Starts at the beginning of the data set and compares the first two elements, and if the first is greater than the second, it swaps them. It continues doing this for each pair of adjacent elements to the end of the data set. It then starts again with the first two elements, repeating until no swaps have occurred on the last pass.

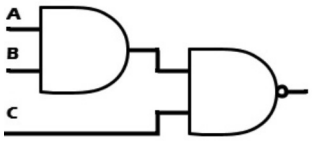
QUESTION 34

Which diagram below represents the logical statement on the right? $A + B + C$

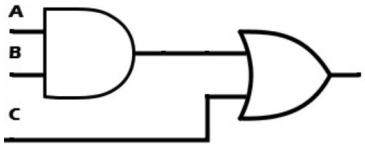
A.



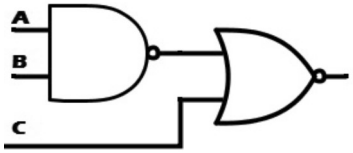
B.



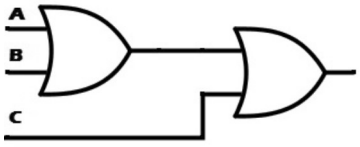
C.



D.



E.



QUESTION 35

Which of the following choices represents the decimal equivalent of the two's complement binary value 10011101?

A. -99 B. -101 C. -103 D. -105 E. -107

QUESTION 36

What is output by the code segment shown?

A. 4 B. 5 C. 6
D. 7 E. 8

```
LinkedList<Integer> list = new
LinkedList<Integer>();
list.add(4);
list.add(5);
list.addFirst(6);
list.addLast(7);
list.add(8);
list.pop();
out.println(list.pop());
```

QUESTION 37

What is output by the code segment to the right?

A. 40 B. 41 C. 63
D. 64 E. There is no output due to an error.

```
String s = "";
for(int x=1;x<40;x*=2)
      for(int y=1;y<=x;y++)
            s+='*';
out.println(s.length());
```

QUESTION 38

What is output by the code to the right?

A. `1 2 3 4 5 7 7 9`
B. `1 5 9 7 2 4 3 7`
C. `2 3 4 7 7 9 1 5`
D. `9 7 1 5 2 4 3 7`
E. `9 2 4 5 7 3 1 7`

```
int [] list = {9,7,5,2,4,3,1,7};
Arrays.sort(list,1,5);
for(int x:list)
   out.print(x+" ");
```

QUESTION 39

Free Response Question:

Convert the expression below into the equivalent postfix expression.

- + / S A M * ^ S U ^ N G

QUESTION 40

Free Response Question:

Find f(3,5) using the function definition shown below.

```
f(x,y) = x              when y = 1
       = x * f(x,y-1)   when y > 1

f(3,5) = __________
```