Name:_____ **Code:** _____

Lab: (circle one) **12MW** **2MW** **4MW** **5:30MW** **7:00MW**

Multiple Choice *70 points (35 items @ 2 point each)* Select the letter in front of the most correct answer, and mark your answer scan sheet accordingly. Be sure and consider each response.

For questions 1-10, write the word "nothing" if no output is created. Assume the following variables have been declared:

```
int     n1, n2;
double  d1, d2;
```

1. What is the exact output of the following code segment?

```
n1 = 3;
n2 = 8;
if (n1 <= n2)
     System.out.print(n1 + " ");
System.out.print(n2 + " ");
System.out.println ("end");
```

a) 3 8 end
b) 8 end
c) 3
   8
   end
d) 8
   end
e) nothing

2. What is the exact output of the following code segment?

```
d1 = 13.4;
d2 = 9.801;
if (d1 == d2)
     System.out.print ("equal ");
else if (d1 > d2)
     System.out.print ("greater ");
else { System.out.print ("less ");
System.out.print ("end");
}
```

a) end b) greater c) greater end d) greater less end e) nothing

3. What is the exact output of the following code segment?

```
n1 = 16;
d1 = 3.2;
n2 = 0;
while (d1 < n1) {
     n2 = n2 + 1;
     d1 = d1 + 5;
     }
System.out.println (n2 + " " + d1);
```

a) 0 3.2 b) 1 13.2 c) 2 18.2 d) 3 18.2 e) nothing

4. What is the exact output of the following code segment?

```
if ( 23 <= 5)
     if (4 >= 2)
             System.out.print ("middle ");
     else
             System.out.print ("not ");
System.out.print ("end");
```

a) end b) not end c) middle end d) middle not end e) nothing

5. What is the exact output of the following code segment?

```
if ( 3 <= 15)
     if (4 >= 2)
             System.out.print ("happy ");
     else System.out.print ("sad ");
System.out.println ("end");
```

a) happy b) sad c) sad end d) happy end d) nothing

6. What is the exact output of the following code segment?

```
if ( 13 <= 5)
     if (4 <= 2)
             System.out.print ("red ");
      else {
     System.out.print ("blue ");
     System.out.print ("end");
    }
```

a) red b) blue end c) red end d) red blue end e) nothing

7. What is the exact output of the following code segment?

```
if ( 13 <= 5)  {
     if (4 <= 2)
             System.out.print ("red ");
     else
             System.out.print ("blue ");
System.out.print ("end");
}
```

a) end b) blue end c) red end d) red blue end e) nothing

8. What is the exact output of the following code segment?

```
n1 = 3;
while (n1 < 8) {
     if (n1 % 2 == 0)
             System.out.print (n1 + " ");
     n1 = n1 + 3;

     if (n1 % 3 == 0)
             System.out.print (n1 + " ");
     n2 = n1;

     while (n2 < 6) {
             System.out.print (n2);
             n2 = n2 + 1;
             }
}
```

a) 3 6 9 b) 3 3 9 c) 6 6 9 d) 3 4 5 e) nothing

9. What is the exact output of the following code segment?

```
n2 = 0;
for (n1 = 24; n1 <= 30; n1 = n1 + 2)
     n2 = n2 + n1;
System.out.println (n2);
```

a) 78 b) 108 c) 24 50 78 d) 24 50 78 108 e) nothing

10. What is the exact output of the following code segment?

```
char ch;
String s1 = new String("this is it");
n1 = 0;
n2 = 0;
do {
    if (s1.charAt(n1) == 'i')
         n2 = n2 + 2;

    else
         n2++;
    n1 = n1 + 1;
 } while (n1 < s1.length());
System.out.println (n2);
```

a) 6 b) 10 c) 11 d) 13 e) nothing

11. What is the exact output of the following code segment?

```
int num = 6;
while (num < 16) {
   switch (num % 4) {
      case 0: System.out.print ("multiple ");
         break;
      case 1: System.out.print ("one ");
         break;
      case 2: System.out.print ("two ");
      case 3: System.out.print ("three ");
         break;
   }
   num += 3;
}
```

a) one multiple one two three b) one multiple one three two c) two three one multiple three
d) two one multiple three e) none of the above

12. Which of the following is a correct interface?

Code 1:	Code 2:	Code 3:	Code 4:

interface A {
void print() { };
}
	abstract interface A {
	print();
	}
		abstract interface A {
		abstract void print() { };
		}
			interface A {
			void print();
			}

a) Code 1
b) Code 2
c) Code 3
d) Code 4
e) none of the above

13. Given the following code segment: where A is an interface, B is a concrete class with a default constructor that implements A.

```
interface A{

}
class B implements A{

}
```

Which of the following is correct?
a) A a = new A();
b) A a = new B();
c) B b = new A();
d) B b = new B();
e) b and d

14. What is the representation of the third element in an array called a?
a) a[2] b) a(2) c) a[3] d) a(3) e) none of the above

15. Analyze the following code.
```
public class Test {
  public static void main(String[] args) {
    int[] x = new int[3];
    System.out.println("x[0] is " + x[0]);
  }
}
```
a) The program has a compiler error because the size of the array wasn't specified when declaring the array.
b) The program has a runtime error because the array elements are not initialized.
c) The program runs fine and displays x[0] is 0.
d) The program has a runtime error because the array element x[0] is not defined.
e) none of the above

16. Which of the following statements is valid?
a) int i = new int(30);
b) int[] i = {3, 4, 3, 2};
c) double d[30] = new double[];
d) char[] c = new char();
e) char[] c = new char[4]{'a', 'b', 'c', 'd'};

17. What is the output of the following code?
```
public class Test17 {
   public static void main(String[] args) {
     int[] x = {1, 2, 3, 4};
     int[] y = x;

     x = new int[2];

     for (int i = 0; i < y.length; i++)
       System.out.print(y[i] + " ");
   }
}
```
a) 1 2 3 4
b) 0 0
c) 0 0 3 4
d) 0 0 0 0
e) none of the above

18. Assume `double[][] x = new double[4][5]`, what are x.length and x[2].length?
a) 4 and 4 b) 4 and 5 c) 5 and 4 d) 5 and 5 e) none of the above

19. What is wrong in the following code?
```
class TempClass {
   int i;
   public void TempClass(int j) {
     int i = j;
   }
}

public class C {
   public static void main(String[] args) {
     TempClass temp = new TempClass(2);
   }
}
```
a) The program has a compilation error because TempClass does not have a default constructor.
b) The program has a compilation error because TempClass does not have a constructor with an int argument.
c) The program compiles fine, but it does not run because class C is public.
d) a and b.
e) None of the above.

20. Variables that are shared by every instances of a class are _____ variables.
a) public b) private c) protected d) static e) instance

21. To declare a constant MAX_LENGTH as a static variable with value 99.98, you write
a) final static MAX_LENGTH = 99.98;
b) final static double MAX_LENGTH = 99.98;
c) static double MAX_LENGTH = 99.98;
d) final double MAX_LENGTH = 99.98;
e) final double static MAX_LENGTH = 99.98;

22. To set a FlowLayout in panel jp, you can use the method _____.
a) jp.setLayout(new FlowLayout(FlowLayout.center));
b) jp.setLayout(new FlowLayout(FlowLayout.CENTER));
c) jp.setLayout(new FlowLayout());
d) jp.setLayout(FlowLayout());
e) a or b

23. What is the output of the following code?

```
public class Test23 {
   public static void main(String[] args) {
     int n = 2;
     xMethod(n);

     System.out.println("n is " + n);
   }

   void xMethod(int n) {
     n++;
   }
}
```

a) The code has a compiler error because xMethod does not return a value.
b) The code has a compiler error because xMethod is not declared static.
c) The code prints n is 1.
d) The code prints n is 2.
e) The code prints n is 3.

24. What does the first System.out.println in the main method print?

```
public class Foo {
  static int i = 0;
  static int j = 0;

   public static void main(String[] args) {
     int i = 2;
     {
        int j = 3;
        System.out.print("i + j = " + (i + j));
     }

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

a) i + j = 5; j = 0
b) i + j = 5; j = 3
c) i + j = 0; j = 0
d) i + j = 0; j = 3
e) compiler error

25. The default layout out of a contentPane in a JFrame is _____.
    a) FlowLayout
    b) GridLayout
    c) BorderLayout
    d) GridBagLayout
    e) TabbedLayout

26. Java arrays can store primitive types and Strings, but cannot store any other type of Object other than Strings.
    a) True b) False

27. What is the printout of the following switch statement?

```
char ch = 'b';

switch (ch) {
   case 'a':
      System.out.print(ch);
   case 'b':
      System.out.print(ch);
   case 'c':
      System.out.print(ch);
   case 'd':
      System.out.print(ch);
}
```

    a) abcd b) bcd c) bbb d) bb e) b

28. What is the output of the following code?

```
class Test29{
   public static void main(String[] args) {
     int x = 3;
     int y = 0;

     switch (x + 3) {
        case 6: y = 0;
        case 7: y = 1;
        default: y += 1;
     }

     System.out.print (y);
   }
 }
}
```

    a) 1 b) 2 c) 3 d) 4 e) 9

29. What is y after the following statement is executed?

```
int x = 0;
int y = (x > 0) ? 10 : -10;
```

    a) 0 b) 10 c) 20 d) -10 e) Illegal expression

30. The following loop is syntactically correct.

```
for (; ; );
```

    a) True b) False

31. What is the printout of the following switch statement?

```
char ch = 'a';

switch (ch) {
   case 'a':
   case 'A':
      System.out.print(ch);
      break;
   case 'b':
   case 'B':
      System.out.print(ch);
      break;
   case 'c':
   case 'C':
      System.out.print(ch);
      break;
   case 'd':
   case 'D':
      System.out.print(ch);
}
```

a) ab b) aa c) a d) abcd e) compiler error

32. The following two statements result in the same value in sum

`int sum = 0;`
`for (int i = 0; i < 3; i++) {`
`  sum += i;`
`}`
	`int sum = 0;`
	`for (int i = 0; i < 3; i = i+1) {`
	`  sum += i;`
	`}`

a) True b) False

33. In order to implement Comparable in a class, what method(s) must be defined in that class?
a) equals
b) compares
c) both lessThan and greaterThan
d) compareTo
e) both compares and equals

34. Aggregation is
a) described as a has-a relationship
b) using an object reference as a local variable
c) a form of software documentation
d) all of the above
e) none of the above

35. When a class implements an interface, what must it do?
a) it must redefine each constant from the interface.
b) it must declare and provide a method body for each method in the interface.
c) it must declare a variable for each constant in the interface.
d) it must include a private method for each method in the interface.
e) none of the above

Short Answer 10 points (4 + 3 + 3 *points each*)
What is the output of the following code fragments? Place your answer in the space provided)

36)

```
public class Short1 {
   public static void main(String[] args) {
     int[] list = {1, 2, 3, 4};

     int[] newList = new int[list.length];

     for (int i = 0; i < list.length; i++)
        newList[i] = list[list.length - 1 - i];

     for (int i = 0; i < newList.length; i++)
        System.out.print(newList[i] + " ");
   }
}
```

Output:

```
4 3 2 1
```

37)

```
public class Short2 {
   public static void main(String argv[]) {
     MyClass m1 = new MyClass ();
     m1.iMyVal=0;
     MyClass m2 = new MyClass ();
     m2.iMyVal=1;
     MyClass m3 = new MyClass ();
     m3.iMyVal=99;
     System.out.println("m1.iMyVal = "+m1.iMyVal);
     System.out.println("m2.iMyVal = "+m2.iMyVal);
     System.out.println("m3.iMyVal = "+m3.iMyVal);
   }
}

class MyClass{
  public static int iMyVal=0;
}
```

Output:

```
m1.iMyVal = 99
m2.iMyVal = 99
m3.iMyVal = 99
```

38)

```
class Short3{
   public static void main (String args[]){
     int result = 0;
     int j = 7;
     if (3 > 2) {
        result = 1;
        if (j > 4)
           result = 6;
        else
           result = 5;
     }
     System.out.println ("Result = " + result);

     String i = (j<=6)? "lesser" : "greater";
     System.out.println ("i = " + i);

     i = (j<=8)? "lesser" : "greater";
     System.out.println ("i = " + i);
   }
}
```

Output:

```
Result = 6
i = greater
i = lesser
```

39) **Problem** *(20 points)* In the following driver program we create an array of 3 books and print out the details of each using a for loop. Then using the method largest we determine the book with the most number of pages. Fill in the missing parts (20 blanks @ 1 point each) of the following Java program. Use the SAMPLE OUTPUT to help determine your answers. Place your answers in spaces provided.

```
1    class DriverProgram{
2      static private Book[] library = new Book[3];
3
4       public static void main (String[] args){
5         library[__0___] = new Book("William", "Strunk Jr.", "The Elements of Style", 105 );
6         library[__1___] = new Book("Thomas", "Friedman", "The World Is Flat", 496 );
7         library[__2___] = new Book("Dan", "Brown", "Angels & Demon", 608);
8
9         for (int i= 0_____; i < library.length_; i++_______ )
10           System.out.println( library[i]__ );
11
12        System.out.println ("\n\nBook with most number of pages = ");
13        System.out.println( largest(library[0], library[1], library[2]) );
14     }
15
16      static Comparable largest (Comparable b1,
17      Comparable b2, Comparable b3 ){
18         Comparable largest=null;
19
20        if (b1.compareTo(b2)>0 && b1.compareTo(b3)>0)
21           largest = b1;
22
23        if (b2.compareTo(b3)>0 && b2.compareTo(b1)>0)
24           largest = b2;
25
26        if (b3.compareTo(b2)>0 && b3.compareTo(b1)>0)
27           largest = b3;
28        return largest;
29     }
30   }
```

SAMPLE OUTPUT

Author: William Strunk Jr.	Title: The Elements of Style	Pages: 105
Author: Thomas Friedman	Title: The World Is Flat	Pages: 496
Author: Dan Brown	Title: Angels & Demon	Pages: 608

Book with most number of pages =
Author: Dan Brown Title: Angels & Demon Pages: 608

```
1    class Book implements Comparable {
2      private String authorFirst,
3       authorLast, title;
4      private int pages;
5
6       public Book (String authorF, String authorL,
7       String title, int pages){
8         authorFirst = authorF_____;
9         authorLast = authorL;
10        this.title = title_______;
11        this.pages = pages;
12     }
13
14      public String toString(){
15        String result = "Author: " + _authorFirst +" " + authorLast + "\tTitle: " +
16            title + "\tPages: " + pages;
17        return result_;
18     }
19
20      public int compareTo (Object obj_ ){
21        Book obj2 = (Book) obj;
22        Integer pagesObj1  = new Integer (pages);
23        Integer pagesObj2  = new Integer (obj2.pages);
24        return (pagesObj1.compareTo(pagesObj2));
25     }
26   }
```