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.

1. Java is interpreted, but not compiled
   a) True b) False

2. The words required at the start of every "main" method definition are:
   a) private static void
   b) public static void
   c) public void
   d) public static
   e) static void

3. Which of the following is an INVALID identifier?
   a) funny$ b) book-mark c) num_2 d) num2 e) _num

For questions 4-6, write the word "nothing" if no output is created. Assume the following variables have been declared:

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

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

```
n1 = 17;
d1 = n1/4;
d2 = n1/2.0;
System.out.println (d1 + " " + d2);
```

   a) 4.0 8.5
   b) 4.25 8.5
   c) 4.5 8.5
   d) 4.0 8.0
   e) nothing

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

```
n1 = 3 - 14 / 2 % 5 + -3;
System.out.println (n1);
```

   a) -11 b) -7 c) -4 d) -2 e) nothing

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

```
d1 = 3 * 5 - 1.5 * 5 / 3;
System.out.println (d1);
```

   a) 22.5 b) 13.5 c) 12.5 d) 7.5 e) nothing

7. Which of the following represents the correct increasing range of values for integer types, from left to right?
   a) byte long short int
   b) int byte short long
   c) byte short int long
   d) short byte long int
   e) none of the above

8. One byte has _____ bits.
   a) 4 b) 8 c) 12 d) 16 e) none of the above

9. Java was developed by _____.
   a) Sun Microsystems b) Microsoft c) HP d) IBM e) Cisco Systems

10. Which of the following statements is correct to display Welcome to Java on the console?
    a) System.out.println ('Welcome to Java');
    b) System.out.println (“Welcome to Java”);
    c) system.println (“Welcome to Java”);
    d) System.out.print ('Welcome to Java');
    e) system.out.print (“Welcome to Java”);

11. Suppose you define a Java class as follows:

```
public class Test {

}
```

    In order to compile this program, the source code should be stored in a file named
    a) Test.class
    b) Test.doc
    c) Test.txt
    d) Test.java
    e) Any name with extension .java

12. Which of the following lines is <u>not</u> a Java comment?
    a) /** comments */
    b) // comments
    c) -- comments
    d) /* comments */
    e) //** comments **\\

13. Which of the following is a correct way to declare variables?
    a) int length: int width;
    b) int length, width;
    c) int length; width;
    d) int length, int width;
    e) none of the above

14. What is the value of variable *i* printed by the following code?

```
public class Test {
  public static void main(String[] args) {
    int j = 0;
    int i = ++j  * 5;

    System.out.println("What is i? " + i);
  }
}
```

    a) 0 b) 1 c) 5 d) 6 e) program fails to compile

15. The reserved word _____ is required to declare a class.
    a) class b) static c) public d) private e) all of the above

16. If a program compiles fine, but it produces incorrect result, then the program suffers _____.
    a) a compilation error
    b) a runtime error
    c) a logical error
    d) all of the above
    e) none of the above

17. What is the value of variable *i* printed by the following code?

```
public class Test {
  public static void main(String[] args) {
    int j = 0;
    int i = j++ * 5;

    System.out.println("What is i? " + i);
  }
}
```

a) 0 b) 1 c) 5 d) 6 e) program fails to compile

18. The expression "Java " + 1 + 2 + 3 evaluates to _____.
    a) Java123
    b) Java6
    c) Java15
    d) Java33
    e) Illegal expression

19. _____ is invoked to create an object.
    a) The main method
    b) A method with a return type
    c) A method with the void return type
    d) A public variable
    e) A constructor

20. Given the declaration Account x = new Account (), which of the following statement is most accurate.
    a) x contains an int value.
    b) x contains an object of the Account type.
    c) x contains a reference to a Account object.
    d) You can assign an int value to x.
    e) none of the above

21. Parameters to methods always appear within _____.
    a) brackets
    b) quotation marks
    c) curly braces
    d) parentheses
    e) any type of braces

22. Assume String s = "ABCABC", the method _____ returns a new string "aBCaBC".
    a) s.toLowerCase (s);
    b) s.toLowerCase ();
    c) s.replace ('A', 'a');
    d) s.replace ('a', 'A');
    e) s.toLowerCase (' a', 0, 3);

23. Suppose you wish to provide an accessor method for a boolean variable called *finished*. What method header should be used?
    a) public void getFinished()
    b) public boolean getFinished()
    c) public boolean setFinished()
    d) public void setFinished()
    e) none of the above

24. Multiplying two numbers when you meant to add them is a/an _____ error.
    a)run-time b)logical c)compile-time d)system e)java

25. Typing a { when you should have typed a (is a/an _____ error.
    a)run-time b)logical c)compile-time d)system e)java

26. Analyze the following code:

```
public class Test {
  public static void main(String[] args) {
    double radius;
    final double PI= 3.15169;
    double area = radius * radius * PI;
    System.out.println("Area is " + area);
  }
}
```

a) The program has a compilation error because the variable radius is not initialized.
b) The program has a syntax error because a constant PI is defined inside a method.
c) The program has no syntax errors but will get a runtime error because radius is not initialized.
d) The program compiles and runs fine.
e) none of the above

27. Which of the following is <u>not</u> a reserved word?
a) int b) void c) main d) float e) class

28. The words _____ are reserved in Java as Boolean literals:
a) true, false b) TRUE, FALSE c) True, False d) any of the above e) none of the above

29. Well encapsulated classes have _____ variables and _____ methods.
a) public, private b) private, public c) formal, actual d) actual formal e) none of the above

30. How many unique items can be represented by 10 bits?
a) 2^9 b) 2^{10} c) 2^{11} d) 10^2 e) 9^2

31. The following code segment

```
int num = 10.0;
```

a) declares a variable num as integer and assigns it a value 10.0
b) only declares a variable num as integer
c) only assigns it a value 10.0
d) is a compiler error
e) is an example of how we use a narrowing assignment

32. If a method does not have a return statement, then
a) it will produce a syntax error when compiled
b) it must be a void return type
c) it can not be called from outside the class that defined the method
d) it must be defined to be a public method
e) it must be an int, double, float or String method

33. The relationship between a class and an object is best described as
a) classes are instances of objects
b) objects are instances of classes
c) objects and classes are the same thing
d) classes are programs while objects are variables
e) objects are the instance data of classes

34. If x is the String "Hi There", then x.toUpperCase().toLowerCase(); will return the original version of x.
a) True b) False

35. Select the TRUE statement from the choices below, regarding the difference between LAN and WAN network?
a) WAN connects two or more LANs.
b) LAN spans long distances.
c) WAN spans short distances.
d) LAN connects two or more WANs.
e) none of the above

Short Answer 10 points (4 + 4 + 2 *points each*)
What is the output of the following code fragments? Place your answer in the space provided)

36)

```
class Short1{
   public static void main(String[] args) {
     String s1 = new String("Welcome to Java!");
     String s2 = s1.toUpperCase();

     System.out.println (s2);

     int index = s1.indexOf(" ");
     String s3 = s1.substring (0, index);
     System.out.println (s3);

     s3 = s3.concat ("!");
     System.out.println (s3);

     System.out.println (s1.length());
   }
}
```

Output:

37)

```
class Short2{
   public static void main(String[] args) {

     int x = 1;
     int y = x++ + x;
     System.out.println("y is " + y);

     y = x + ++x;
     System.out.println("y is " + y);

     x = 2;
     y = 3;
     double z = Math.pow (y, x);

     System.out.println ("Square Root of " +
        z + " = " +Math.sqrt (z));
   }
}
```

Output:

38)

```
import java.text.DecimalFormat;
import java.util.Random;

class Short3{
   public static void main(String[] args) {

     DecimalFormat df = new DecimalFormat("0.##");
     double val = 4.12567;
     System.out.println(df.format(val));

     Random rand = new Random();
     System.out.println (rand.nextInt (1));
   }
}
```

Output:

39) **Problem** *(20 points)*

The following driver program `Sphere.java` displays a frame that reads the radius of a sphere from the user in a textfield. When the user hits the enter key, the volume and surface area of the sphere is computed using the following formulae and the GUI is updated. The volume and area are displayed to three decimal places. 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.

$$\text{Volume} = \frac{4\ \Pi\ r^3}{3} \qquad \text{Surface Area} = 4\ \Pi\ r^2$$

```
1   import javax.swing.JFrame;
2
3    public class ____________________________________ {
4       public static void main (String[] args) {
5         JFrame frame = new JFrame ("_____________________________________________________");
6         frame.setDefaultCloseOperation (JFrame.EXIT_ON_CLOSE);
7
8         SpherePanel panel = new SpherePanel();
9
10        frame.getContentPane().add(_____________________________________);
11        frame.pack();
12        frame.setVisible(_____________________________________);
13     }
14  }
```

```
1   ____________________________________ java.awt.*;
2   import java.awt.event.*;
3   import javax.swing.*;
4   import java.text.DecimalFormat;
5
6    public ________________ SpherePanel extends JPanel {
7      private ____________________ inputLabel, volLabel, areaLabel;
8      private JTextField radius;
9
10      public SpherePanel() {
11        inputLabel = new JLabel ("Enter radius of the sphere:");
12        volLabel = new JLabel ("Volume of the sphere = ");
13        areaLabel = new JLabel ("Surface area of the sphere = ");
14        radius = new ____________________________ (5);
15        radius.addActionListener (new _____________________());
16        add (inputLabel);
17        add (_____________________________);
18        add (_____________________________);
19        add (areaLabel);
20        setPreferredSize (new Dimension(300, 75));
21        setBackground (Color.yellow);
22     }
23
24      private ____________________ TempListener implements ActionListener {
25         public void actionPerformed (ActionEvent event) {
26           double r, volume, surfacearea;
27           String text = radius.getText();
28           r = Double.parseDouble (_____________________________);
29
30        //compute the volume
31           volume = (((4) * (Math._______________) * (Math.pow((_____________________),3)))/3);
32
33        //compute the surface area
34           surfacearea = ((_____________) * (Math.PI) * (Math._____________________((r),2)));
35
36        //print result
37           DecimalFormat df = new _____________________ ("0.###");
38           volLabel.setText ("_____________________________________________________ " +
39              df.format(volume));
40           areaLabel.setText ("_____________________________________________________ " +
41              df.format(surfacearea));
42        }
43     }
44  }
```

SAMPLE OUTPUT SCREENS