MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The behavior of an object is defined by the object’s
   A) constructor
   B) instance data
   C) visibility modifiers
   D) methods
   E) all of the above

2) The relationship between a class and an object is best described as
   A) classes are programs while objects are variables
   B) classes are instances of objects
   C) objects are the instance data of classes
   D) objects are instances of classes
   E) objects and classes are the same thing

3) To define a class that will represent a car, which of the following definitions is most appropriate?
   A) public class CAR
   B) private class Car
   C) public class car
   D) private class car
   E) public class Car

4) Which of the following reserved words in Java is used to create an instance of a class?
   A) class
   B) public
   C) public or private, either could be used
   D) new
   E) import

5) In order to preserve encapsulation of an object, we would do all of the following except for which one?
   A) Make the class final
   B) Make the instance data private
   C) Define the methods in the class to access and manipulate the instance data
   D) Make the methods of the class public
   E) All of the above preserve encapsulation

6) If a method does not have a return statement, then
   A) it must be a void method
   B) it must be an int, double, float or String method
   C) it must be defined to be a public method
   D) it will produce a syntax error when compiled
   E) it can not be called from outside the class that defined the method

7) Consider a sequence of method invocations as follows: main calls m1, m1 calls m2, m2 calls m3 and then m2 calls m4, m3 calls m5. If m4 has just terminated, what method will resume execution?
   A) m1   B) m2   C) main   D) m5   E) m3

8) A variable whose scope is restricted to the method where it was declared is known as
   a(n)
   A) private instance data
   B) parameter
   C) local variable
   D) global variable
   E) public instance data
9) A class’ constructor usually defines
   A) the number of instance data in the class
   B) how an object is initialized
   C) the number of methods in the class
   D) if the instance data are accessible outside of the object directly
   E) how an object is interfaced

10) Having multiple class methods of the same name where each method has a different number of or type of parameters is known as
   A) method overloading
   B) importing
   C) information hiding
   D) tokenizing
   E) encapsulation

11) Instance data for a Java class
   A) may be primitive types or objects, but objects must be defined to be private
   B) are limited to primitive types (e.g., int, float, char)
   C) are limited to Strings
   D) are limited to objects (e.g., Strings, classes defined by other programmers)
   E) may be primitive types or objects

12) An example of passing message to a String where the message has a String parameter would occur in which of the following messages?
   A) substring
   B) length
   C) toUpperCase
   D) equals
   E) none of the above, it is not possible to pass a String as a parameter in a message to a String

For the questions below, use the following class definition.

```java
import java.text.DecimalFormat;
public class Student
{
    private String name;
    private String major;
    private double gpa;
    private int hours;

    public Student(String newName, String newMajor, double newGPA, int newHours)
    {
        name = newName;
        major = newMajor;
        gpa = newGPA;
        hours = newHours;
    }

    public String toString()
    {
        DecimalFormat df = new DecimalFormat("xxxx"); // xxxx needs to be replaced
        return name + "\n" + major + "\n" + df.format(gpa) + "\n" + hours;
    }
}
```

13) Which of the following could be used to instantiate a new Student s1?
   A) s1 = new Student( );
   B) new Student(s1);
   C) Student s1 = new Student("Jane Doe", "Computer Science", 3.333, 33);
   D) new Student s1 = ("Jane Doe", "Computer Science", 3.333, 33);
   E) Student s1 = new Student( );

14) Assume that another method has been defined that will compute and return the student's class rank (Freshman, Sophomore, etc). It is defined as:

   public String getClassRank()

Given that s1 is a student, which of the following would properly be used to get s1's class rank?
A) s1 = getClassRank();
B) s1.toString();
C) getClassRank(s1);
D) s1.getHours();
E) s1.getClassRank();

15) Another method that might be desired is one that updates the Student's number of credit hours. This method will receive a number of credit hours and add these to the Student's current hours. Which of the following methods would accomplish this?
A) public updateHours(int moreHours)
   { hours += moreHours; }
B) public int updateHours()
   { return hours; }
C) public int updateHours(int moreHours)
   { return hours + moreHours; }
D) public void updateHours(int moreHours)
   { hours += moreHours; }
E) public void updateHours()
   { hours++; }

16) Consider a Rational class designed to represent rational numbers as a pair of int's, along with methods reduce (to reduce the rational to simplest form), gcd (to find the greatest common divisor of two int's), as well as methods for addition, subtraction, multiplication, and division. Why should the reduce and gcd methods be declared to be private.
A) Because they will never be used
B) Because it is a typo and they should be declared as public
C) Because they will only be called from the constructor of Rational
D) Because they do not use any of Rational's instance data
E) Because they will only be called from methods inside of Rational

17) StringTokenizer is a class in the java.util library that can divide a String based on some delimiter String (a delimiter is a separator). If the instruction StringTokener st = new StringTokenizer(str, "&&"); is executed, where str is some String, then st divides up str into separate Strings whenever
A) a blank space is found
B) two ampersands or the substring "and" or "AND" is found
C) two blank spaces are found
D) a single ampersand ("&") is found
E) two ampersands are found

18) Consider a method defined with the header: public void foo(int a, int b). Which of the following method calls is legal?
A) foo(0);
B) foo(1 + 2, 3 * 0.1);
C) foo();
D) foo(0 / 1, 2 * 3);
E) foo(0, 0.1);

19) Consider a method defined with the header: public void doublefoo(double x). Which of the following method calls is illegal?
A) doublefoo(0.1, 0.2);
B) doublefoo(0.555);
C) doublefoo(0);
D) doublefoo(0.1 + 0.2);
E) doublefoo("Me".compareTo("You"));
20) In a UML diagram for a class
   A) there may be a section containing the name of the class
   B) there may be a section containing the methods of the class
   C) there may be a section containing the attributes (data) of the class
   D) classes are represented as rectangles
   E) all of the above

21) Visibility modifiers include
   A) public, private
   B) public, private, protected, final
   C) public, private, protected
   D) public, private, protected, static
   E) public, protected, final, static

22) The expressions that are passed to a method in an invocation are called
   A) formal arguments
   B) formal parameters
   C) formals
   D) actual parameters
   E) any of the above

23) What happens if you declare a class constructor to have a void return type?
   A) The class' default constructor will be used instead of the one you're declaring
   B) You'll likely receive a syntax error
   C) There's nothing wrong with declaring a constructor to be void
   D) The program will compile with a warning, but you'll get a runtime error
   E) None of the above

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

24) Java methods can return only primitive types (int, double, float, char, boolean, etc).
   24) _____

25) Formal parameters are those that appear in the method call and actual parameters are those that appear in the method header.
   25) _____

26) All Java classes must contain a main method which is the first method executed when the Java class is called upon.
   26) _____

27) Java methods can return more than one item if they are modified with the reserved word continue, as in public continue int foo() { ... }
   27) _____

28) The following method header definition is most likely a syntax error: public void aMethod();
   28) _____

29) A method defined in a class can access the class' instance data without needing to pass them as parameters or declare them as local variables.
   29) _____

30) The interface of a class is based on those data instances and methods that are declared public.
   30) _____

31) Defining formal parameters requires including each parameters type.
   31) _____

32) Every class definition must include a constructor.
   32) _____

33) While multiple objects of the same class can exist, in a given program there can be only one version of each class.
   33) _____

34) An object should be encapsulated in order to guard its data and methods from inappropriate access.
   34) _____

35) Accessors and mutators provide mechanisms for controlled access to a well-encapsulated class.
   35) _____
Answer Key
Testname: AP_CS_TEST_4A

1) D
2) D
3) E
4) D
5) A
6) A
7) B
8) C
9) B
10) A
11) E
12) D
13) C
14) E
15) D
16) E
17) E
18) D
19) A
20) E
21) C
22) D
23) B
24) FALSE
25) FALSE
26) FALSE
27) FALSE
28) TRUE
29) TRUE
30) TRUE
31) TRUE
32) FALSE
33) TRUE
34) TRUE
35) TRUE