

**unit 2 c**

1. Consider the following code segment.

```
String oldStr = "ABCDEF";  
String newStr = oldStr.substring(1, 3) + oldStr.substring(4);  
System.out.println(newStr);
```

What is printed as a result of executing the code segment?

- (A) ABCD
- (B) BCDE
- (C) BCEF
- (D) BCDEF
- (E) ABCDEF

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2. Consider the following class.

```
public class SomeMethods
{
    public void one(int first)
    { /* implementation not shown */ }

    public void one(int first, int second)
    { /* implementation not shown */ }

    public void one(int first, String second)
    { /* implementation not shown */ }
}
```

Which of the following methods can be added to the SomeMethods class without causing a compile-time error?

- I. `public void one(int value)`
`{ /* implementation not shown */ }`
 - II. `public void one (String first, int second)`
`{ /* implementation not shown */ }`
 - III. `public void one (int first, int second, int third)`
`{ /* implementation not shown */ }`
- (A) I only
(B) I and II only
(C) I and III only
(D) II and III only
(E) I, II, and III

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3. A pair of number cubes is used in a game of chance. Each number cube has six sides, numbered from 1 to 6, inclusive, and there is an equal probability for each of the numbers to appear on the top side (indicating the cube's value) when the number cube is rolled. The following incomplete statement appears in a program that computes the sum of the values produced by rolling two number cubes.

```
int sum = /* missing code */;
```

Which of the following replacements for `/* missing code */` would best simulate the value produced as a result of rolling two number cubes?

- (A) `2 * (int) (Math.random() * 6)`
 - (B) `2 * (int) (Math.random() * 7)`
 - (C) `(int) (Math.random() * 6) + (int) (Math.random() * 6)`
 - (D) `(int) (Math.random() * 13)`
 - (E) `2 + (int) (Math.random() * 6) + (int) (Math.random() * 6)`
4. Consider the following methods, which appear in the same class.

```
public void slope(int x1, int y1, int x2, int y2)
{
    int xChange = x2 - x1;
    int yChange = y2 - y1;
    printFraction(yChange, xChange);
}

public void printFraction(int numerator, int denominator)
{
    System.out.print(numerator + "/" + denominator);
}
```

Assume that the method call `slope(1, 2, 5, 10)` appears in a method in the same class. What is printed as a result of the method call?

- (A) 8/4
- (B) 5/1
- (C) 4/8
- (D) 2/1
- (E) 1/5

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5. Consider the following method, which is intended to calculate and return the expression $\sqrt{\frac{(x+y)^2}{|a-b|}}$.

```
public double calculate(double x, double y, double a, double b)
{
    return /* missing code */;
}
```

Which of the following can replace `/* missing code */` so that the method works as intended?

- (A) `Math.sqrt(x ^ 2, y ^ 2, a - b)`
 (B) `Math.sqrt((x + y) ^ 2) / Math.abs(a, b)`
 (C) `Math.sqrt((x + y) ^ 2 / Math.abs(a - b))`
 (D) `Math.sqrt(Math.pow(x + y, 2) / Math.abs(a, b))`
 (E) `Math.sqrt(Math.pow(x + y, 2) / Math.abs(a - b))`
6. Consider the following method.

```
public double myMethod(int a, boolean b)
{ /* implementation not shown */ }
```

Which of the following lines of code, if located in a method in the same class as `myMethod`, will compile without error?

- (A) `int result = myMethod(2, false);`
 (B) `int result = myMethod(2.5, true);`
 (C) `double result = myMethod(0, false);`
 (D) `double result = myMethod(true, 10);`
 (E) `double result = myMethod(2.5, true);`
7. The following statement assigns an integer value to `x`.

```
int x = (int)(Math.random() * 5) + 10;
```

Consider the statement that would result if the positions of `5` and `10` were swapped in the preceding statement and the resulting integer were assigned to `y`.

```
int y = (int)(Math.random() * 10) + 5;
```

Which of the following are true statements about how the possible values assigned to `y` differ from the possible values assigned to `x` ?

- I. There are more possible values of `x` than there are possible values of `y`.
 II. There are more possible values of `y` than there are possible values of `x`.
 III. The value assigned to `x` can sometimes be the same as the value assigned to `y`.

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- (A) I only
- (B) II only
- (C) III only
- (D) I and III
- (E) II and III

8. Consider the following code segment.

```
String str = "CompSci";
System.out.println(str.substring(0, 3));
int num = str.length();
```

What is the value of `num` when the code segment is executed?

- (A) 3
- (B) 4
- (C) 5
- (D) 6
- (E) 7

9. Consider the following code segment.

```
String temp = "comp";
System.out.print(temp.substring(0) + " " +
    temp.substring(1) + " " +
    temp.substring(2) + " " +
    temp.substring(3));
```

What is printed when the code segment is executed?

- (A) comp
- (B) c o m p
- (C) comp com co c
- (D) comp omp mp p
- (E) comp comp comp comp

10. Consider the following code segment.

```
String str = "0";
str += str + 0 + 8;
System.out.println(str);
```

What is printed as a result of executing the code segment?

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- (A) 8
- (B) 08
- (C) 008
- (D) 0008
- (E) Nothing is printed, because numerical values cannot be added to a `String` object.

11. Consider the following code segment.

```
int one = 1;
int two = 2;
String zee = "Z";
System.out.println(one + two + zee);
```

What is printed as a result of executing the code segment?

- (A) 12Z
 - (B) 3Z
 - (C) 12zee
 - (D) 3zee
 - (E) onetwozee
12. Consider the following class declaration.

```
public class Student
{
    private String myName;
    private int myAge;

    public Student()
    { /* implementation not shown */ }

    public Student(String name, int age)
    { /* implementation not shown */ }

    // No other constructors
}
```

Which of the following declarations will compile without error?

- I. `Student a = new Student();`
- II. `Student b = new Student("Juan", 15);`
- III. `Student c = new Student("Juan", "15");`

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- (A) I only
- (B) II only
- (C) I and II only
- (D) I and III only
- (E) I, II, and III

13. Consider the following class declaration.

```
public class Person
{
    private String myName;
    private int myYearOfBirth;

    public Person(String name, int yearOfBirth)
    {
        myName = name;
        myYearOfBirth = yearOfBirth;
    }

    public String getName()
    { return myName; }

    public void setName(String name)
    { myName = name; }

    // There may be instance variables, constructors, and methods that are not shown.
}
```

Assume that the following declaration has been made.

```
Person student = new Person ("Thomas", 1995);
```

Which of the following statements is the most appropriate for changing the name of student from "Thomas" to "Tom" ?

- (A) student = new Person ("Tom", 1995);
- (B) student.myName = "Tom";
- (C) student.getName ("Tom");
- (D) student.setName ("Tom");
- (E) Person.setName ("Tom");

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14. Consider the following method.

```
public static String scramble(String word, int howFar)
{
    return word.substring(howFar + 1, word.length()) +
           word.substring(0, howFar);
}
```

What value is returned as a result of the call `scramble("compiler", 3)`?

- (A) "compiler"
 - (B) "pilercom"
 - (C) "ilercom"
 - (D) "ilercomp"
 - (E) No value is returned because an `IndexOutOfBoundsException` will be thrown.
15. Consider the following method, which is intended to return `true` if at least one of the three strings `s1`, `s2`, or `s3` contains the substring "art". Otherwise, the method should return `false`.

```
public static boolean containsArt(String s1, String s2, String s3)
{
    String all = s1 + s2 + s3;
    return (all.indexOf("art") != -1);
}
```

Which of the following method calls demonstrates that the method does not work as intended?

- (A) `containsArt("rattrap", "similar", "today")`
- (B) `containsArt("start", "article", "Bart")`
- (C) `containsArt("harm", "chortle", "crowbar")`
- (D) `containsArt("matriculate", "carat", "arbitrary")`
- (E) `containsArt("darkroom", "cartoon", "articulate")`

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16. The `Student` class has been defined to store and manipulate grades for an individual student. The following methods have been defined for the class.

```
/* Returns the sum of all of the student's grades */
public double sumOfGrades()
{ /* implementation not shown */ }
/* Returns the total number of grades the student has received */
public int numberOfGrades()
{ /* implementation not shown */ }
/* Returns the lowest grade the student has received */
public double lowestGrade()
{ /* implementation not shown */ }
```

Which of the following statements, if located in a method in the `Student` class, will determine the average of all of the student's grades except for the lowest grade and store the result in the `double` variable `newAverage`?

- (A) `newAverage = sumOfGrades() / numberOfGrades() - 1;`
(B) `newAverage = sumOfGrades() / (numberOfGrades() - 1);`
(C) `newAverage = sumOfGrades() - lowestGrade() / (numberOfGrades() - 1);`
(D) `newAverage = (sumOfGrades() - lowestGrade()) / numberOfGrades() - 1;`
(E) `newAverage = (sumOfGrades() - lowestGrade()) / (numberOfGrades() - 1);`
17. Consider the following method.

```
public void doSomething()
{
    System.out.println("Something has been done");
}
```

Each of the following statements appears in a method in the same class as `doSomething`. Which of the following statements are valid uses of the method `doSomething`?

- I. `doSomething();`
II. `String output = doSomething();`
III. `System.out.println(doSomething());`
- (A) I only
(B) II only
(C) I and II only
(D) I and III only
(E) I, II, and III

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18. Consider the following code segment.

```
double d1 = 10.0;
Double d2 = 20.0;
Double d3 = new Double(30.0);
double d4 = new Double(40.0);

System.out.println(d1 + d2 + d3.doubleValue() + d4);
```

What, if anything, is printed when the code segment is executed?

- (A) 100.0
 - (B) 10.050.040.0
 - (C) 10.020.070.0
 - (D) 10.020.030.040.0
 - (E) There is no output due to a compilation error.
19. Consider the following class definition.

```
public class ExamScore
{
    private String studentId;
    private double score;
    public ExamScore(String sid, double s)
    {
        studentId = sid;
        score = s;
    }
    public double getScore()
    {
        return score;
    }
    public void bonus(int b)
    {
        score += score * b/100.0;
    }
}
```

Assume that the following code segment appears in a class other than ExamScore.

```
ExamScore es = new ExamScore("12345", 80.0);
es.bonus(5);
System.out.println(es.getScore());
```

What is printed as a result of executing the code segment?

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- (A) 4.0
- (B) 5.0
- (C) 80.0
- (D) 84.0
- (E) 85.0

20. Consider the following methods, which appear in the same class.

```
public int function1(int i, int j)
{
    return i + j;
}
```

```
public int function2(int i, int j)
{
    return j - i;
}
```

Which of the following statements, if located in a method in the same class, will initialize the variable `x` to 11?

- (A) `int x = function2(4, 5) + function1(1, 3);`
- (B) `int x = function1(4, 5) + function2(1, 3);`
- (C) `int x = function1(4, 5) + function2(3, 1);`
- (D) `int x = function1(3, 1) + function2(4, 5);`
- (E) `int x = function2(3, 1) + function1(4, 5);`

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21. Consider the following class declaration.

```
public class GameClass
{
    private int numPlayers;
    private boolean gameOver;

    public Game()
    {
        numPlayers = 1;
        gameOver = false;
    }

    public void addPlayer()
    {
        numPlayers++;
    }

    public void endGame()
    {
        gameOver = true;
    }
}
```

Assume that the `GameClass` object `game` has been properly declared and initialized in a method in a class other than `GameClass`. Which of the following statements are valid?

- I. `game.numPlayers++;`
 - II. `game.addPlayer();`
 - III. `game.gameOver();`
 - IV. `game.endGame();`
- (A) IV only
- (B) I and III only
- (C) I and IV only
- (D) II and IV only
- (E) II, III, and IV only

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22. Consider the following class definition.

```
public class Bird
{
    private String species;
    private String color;
    private boolean canFly;
    public Bird(String str, String col, boolean cf)
    {
        species = str;
        color = col;
        canFly = cf;
    }
}
```

Which of the following constructors, if added to the `Bird` class, will cause a compilation error?

- ```
public Bird()
{
 species = "unknown";
 color = "unknown";
 canFly = false;
}
public Bird(boolean cf)
{
 species = "unknown";
 color = "unknown";
 canFly = cf;
}
public Bird(String col, String str)
{
 species = str;
 color = col;
 canFly = false;
}
public Bird(boolean cf, String str, String col)
{
 species = str;
 color = col;
 canFly = cf;
}
public Bird(String col, String str, boolean cf)
{
 species = str;
 color = col;
 canFly = cf;
}
```
- (A)
- (B)
- (C)
- (D)
- (E)

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23. A student has created a `Car` class. The class contains variables to represent the following.

A `String` variable called `color` to represent the color of the car  
An `int` variable called `year` to represent the year the car was made  
A `String` variable called `make` to represent the manufacturer of the car  
A `String` variable called `model` to represent the model of the car

The object `vehicle` will be declared as type `Car`.

Which of the following descriptions is accurate?

- (A) An instance of the `vehicle` class is `Car`.
  - (B) An instance of the `Car` object is `vehicle`.
  - (C) An attribute of the `year` object is `int`.
  - (D) An attribute of the `vehicle` object is `color`.
  - (E) An attribute of the `Car` instance is `vehicle`.
24. Consider the code segment below.

```
int a = 1988;
int b = 1990;

String claim = " that the world's athletes " +
 "competed in Olympic Games in ";

String s = "It is " + true + claim + a +
 " but " + false + claim + b + ".";

System.out.println(s);
```

What, if anything, is printed when the code segment is executed?

- (A) It is `trueclaima but falseclaimb`.
- (B) It is `trueclaim1998 but falseclaim1990`.
- (C) It is `true that the world's athletes competed in Olympic Games in a but false that the world's athletes competed in Olympic Games in b`.
- (D) It is `true that the world's athletes competed in Olympic Games in 1988 but false that the world's athletes competed in Olympic Games in 1990`.
- (E) Nothing is printed because the code segment does not compile.

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25. A student has created an `OrderedPair` class to represent points on an  $xy$ -plane. The class contains the following.

An `int` variable called `x` to represent an  $x$ -coordinate.

An `int` variable called `y` to represent a  $y$ -coordinate.

A method called `printXY` that will print the values of `x` and `y`.

The object `origin` will be declared as type `OrderedPair`.

Which of the following descriptions is accurate?

- (A) `origin` is an instance of the `printXY` method.
- (B) `origin` is an instance of the `OrderedPair` class.
- (C) `origin` is an instance of two `int` objects.
- (D) `OrderedPair` is an instance of the `origin` object.
- (E) `printXY` is an instance of the `OrderedPair` class.

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26. Consider the following attempts at method overloading.

**I.**

```
public class Overload
{
 public int average(int x, int y)
 { /* implementation not shown */ }

 public int average(int value1, int value2)
 { /* implementation not shown */ }

 // There may be instance variables, constructors,
 // and methods that are not shown.
}
```

**II.**

```
public class Overload
{
 public int average(int x, int y)
 { /* implementation not shown */ }

 public int average(int x, int y, int z)
 { /* implementation not shown */ }

 // There may be instance variables, constructors
 // and methods that are not shown.
}
```

**III.**

```
public class Overload
{
 public int average(int x, int y)
 { /* implementation not shown */ }

 public int average(double x, double y)
 { /* implementation not shown */ }

 // There may be instance variables, constructors,
 // and methods that are not shown.
}
```

Which of the attempts at method overloading will compile without error?



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- (A) I only
- (B) II only
- (C) III only
- (D) II and III only
- (E) I, II, and III

27. Consider the following `Point2D` class.

```
public class Point2D
{
 private double xCoord;
 private double yCoord;

 public Point2D(double x, double y)
 {
 xCoord = x;
 yCoord = y;
 }
}
```

Which of the following code segments, appearing in a class other than `Point2D`, will correctly create an instance of a `Point2D` object?

- (A) `Point2D p = (3.0, 4.0);`
- (B) `Point2D p = Point2D(3.0, 4.0);`
- (C) `new p = Point2D(3.0, 4.0);`
- (D) `new Point2D = p(3.0, 4.0);`
- (E) `Point2D p = new Point2D(3.0, 4.0);`

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28. Consider the following methods, which appear in the same class.

```
public void printSum(int x, double y)
{
 System.out.println(x + y);
}

public void printProduct(double x, int y)
{
 System.out.println(x * y);
}
```

Consider the following code segment, which appears in a method in the same class as `printSum` and `printProduct`.

```
int num1 = 5;
double num2 = 10.0;
printSum(num1, num2);
printProduct(num1, num2);
```

What, if anything, is printed as a result of executing the code segment?

- (A) 15  
50
  - (B) 15  
50.0
  - (C) 15.0  
50
  - (D) 15.0  
50.0
  - (E) Nothing is printed because the code does not compile.
29. Consider the `processWords` method. Assume that each of its two parameters is a `String` of length two or more.

```
public void processWords(String word1, String word2)
{
 String str1 = word1.substring(0, 2);
 String str2 = word2.substring(word2.length() - 1);
 String result = str2 + str1;
 System.out.println(result.indexOf(str2));
}
```

Which of the following best describes the value printed when `processWords` is called?

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- (A) The value 0 is always printed.
- (B) The value 1 is always printed.
- (C) The value `result.length() - 1` is printed.
- (D) A substring containing the last character of `word2` is printed.
- (E) A substring containing the last two characters of `word2` is printed.

30. Consider the following method.

```
public double puzzle(int x)
{
 Double y = x / 2.0;
 y /= 2;

 return y.doubleValue();
}
```

Assume that the method call `puzzle(3)` appears in a method in the same class as `puzzle`. What value is returned as a result of the method call?

- (A) 0.0
  - (B) 0.5
  - (C) 0.75
  - (D) 1.0
  - (E) 1.5
31. Which of the following statements assigns a random integer between 25 and 60, inclusive, to `rn` ?
- (A) `int rn = (int) (Math.random() * 25) + 36;`
  - (B) `int rn = (int) (Math.random() * 25) + 60;`
  - (C) `int rn = (int) (Math.random() * 26) + 60;`
  - (D) `int rn = (int) (Math.random() * 36) + 25;`
  - (E) `int rn = (int) (Math.random() * 60) + 25;`
32. Which of the following statements assigns a random integer between 1 and 10, inclusive, to `rn` ?
- (A) `int rn = (int) (Math.random()) * 10;`
  - (B) `int rn = (int) (Math.random()) * 10 + 1;`
  - (C) `int rn = (int) (Math.random() * 10);`
  - (D) `int rn = (int) (Math.random() * 10) + 1;`
  - (E) `int rn = (int) (Math.random() + 1) * 10;`

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33. Consider the following code segment, which is intended to assign to `num` a random integer value between `min` and `max`, inclusive. Assume that `min` and `max` are integer variables and that the value of `max` is greater than the value of `min`.

```
double rn = Math.random();
int num = /* missing code */;
```

Which of the following could be used to replace `/* missing code */` so that the code segment works as intended?

- (A) `(int) (rn * max) + min`
  - (B) `(int) (rn * max) + min - 1`
  - (C) `(int) (rn * (max - min)) + min`
  - (D) `(int) (rn * (max - min)) + 1`
  - (E) `(int) (rn * (max - min + 1)) + min`
34. Consider the following code segment. Assume that `a` is greater than zero.

```
int a = /* value not shown */;
int b = a + (int) (Math.random() * a);
```

Which of the following best describes the value assigned to `b` when the code segment is executed?

- (A) `a`
  - (B) `2 * a`
  - (C) A random integer between 0 and `a - 1`, inclusive
  - (D) A random integer between `a` and `2 * a`, inclusive
  - (E) A random integer between `a` and `2 * a - 1`, inclusive
35. Assume that the following variable declarations have been made.

```
double d = Math.random();

double r;
```

Which of the following assigns a value to `r` from the uniform distribution over the range  $0.5 \leq r < 5.5$  ?

- (A) `r = d + 0.5;`
- (B) `r = d + 0.5 * 5.0;`
- (C) `r = d * 5.0;`
- (D) `r = d * 5.0 + 0.5;`
- (E) `r = d * 5.5;`

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Directions: Select the choice that best fits each statement. The following question(s) refer to the following information.

Consider the following partial class declaration.

```
public class SomeClass
{
 private int myA;
 private int myB;
 private int myC;

 // Constructor(s) not shown

 public int getA()
 { return myA; }

 public void setB(int value)
 { myB = value; }
}
```

36. The following declaration appears in another class.  
SomeClass obj = new SomeClass ();  
Which of the following code segments will compile without error?
- (A) int x = obj.getA ();
  - (B) int x;  
obj.getA (x);
  - (C) int x = obj.myA;
  - (D) int x = SomeClass.getA ();
  - (E) int x = getA(obj);
- 

37. A student has created a `Song` class. The class contains the following variables.

A `String` variable called `artist` to represent the artist name  
A `String` variable called `title` to represent the song title  
A `String` variable called `album` to represent the album title

The object `happyBirthday` will be declared as type `Song`.

Which of the following statements is true?

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- (A) artist, title, and album are instances of the Song class.
- (B) happyBirthday is an instance of three String objects.
- (C) happyBirthday is an instance of the Song class.
- (D) Song is an instance of the happyBirthday object.
- (E) Song is an instance of three String objects.

38. Consider the following class definition.

```
public class Student
{
 private int studentID;
 private int gradeLevel;
 private boolean honorRoll;

 public Student(int s, int g)
 {
 studentID = s;
 gradeLevel = g;
 honorRoll = false;
 }

 public Student(int s)
 {
 studentID = s;
 gradeLevel = 9;
 honorRoll = false;
 }
}
```

Which of the following code segments would successfully create a new Student object?

- I. `Student one = new Student(328564, 11);`
  - II. `Student two = new Student(238783);`
  - III. `int id = 392349;`  
`int grade = 11;`  
`Student three = new Student(id, grade);`
- (A) I only
  - (B) II only
  - (C) III only
  - (D) I and II only
  - (E) I, II, and III

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39. Consider the following class definition.

```
public class Thing
{
 public void talk()
 {
 System.out.print("Hello ");
 }

 public void name()
 {
 System.out.print("my friend");
 }

 public void greet()
 {
 talk();
 name();
 }
 /* Constructors not shown */
}
```

Which of the following code segments, if located in a method in a class other than `Thing`, will cause the message "Hello my friend" to be printed?

- (A) `Thing a = new Thing();`  
`Thing.talk();`  
`Thing.name();`
- (B) `Thing a = new Thing();`  
`Thing.greet();`
- (C) `Thing a = new Thing();`  
`a.talk();`
- (D) `Thing a = new Thing();`  
`a.greet();`
- (E) `Thing a = new Thing();`  
`a.name();`  
`a.talk();`

## unit 2 c

40. Consider the following method.

```
public int timesTwo (int n)
{
 return n * 2;
}
```

The following code segment appears in a method in the same class as the `timesTwo` method.

```
Integer val = 10;
int result1 = timesTwo(val);
Integer result2 = result1;
System.out.print(result2);
```

What, if anything, is printed as a result of executing the code segment?

- (A) 10
  - (B) 20
  - (C) Nothing; the code segment will not compile because `timesTwo` cannot accept an `Integer` parameter.
  - (D) Nothing; the code segment will not compile because the value returned by `timesTwo` cannot be assigned to `result1`.
  - (E) Nothing; the code segment will not compile because the `int` variable `result1` cannot be assigned to the `Integer` variable `result2`.
41. Consider the following class.

```
public class WindTurbine
{
 private double efficiencyRating;
 public WindTurbine()
 {
 efficiencyRating = 0.0;
 }
 public WindTurbine(double e)
 {
 efficiencyRating = e;
 }
}
```

Which of the following code segments, when placed in a method in a class other than `WindTurbine`, will construct a `WindTurbine` object `wt` with an `efficiencyRating` of 0.25 ?



**unit 2 c**

- (A) `WindTurbine wt = new WindTurbine(0.25);`
- (B) `WindTurbine wt = 0.25;`
- (C) `WindTurbine wt = new WindTurbine();`  
`wt = 0.25;`
- (D) `WindTurbine wt = new WindTurbine();`  
`wt.efficiencyRating = 0.25;`
- (E) `new WindTurbine wt = 0.25;`