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

1) The ________ method returns a raised to the power of b.
   A) Math.pow(b, a)  
   B) Math.power(a, b)  
   C) Math.pow(a, b)  
   D) Math.exponent(a, b)

2) What is the printout of the following code:
   ```java
double x = 5.5;
int y = (int)x;
System.out.println("x is " + x + " and y is " + y);
```
   A) x is 5 and y is 6  
   B) x is 5.5 and y is 5  
   C) x is 5.5 and y is 5.0  
   D) x is 6.0 and y is 6.0  
   E) x is 6 and y is 6

3) The result of an integer division is the integer part of the division; the fraction part is truncated.
   A) true  
   B) false

4) The keyword ________ must be used to declare a constant.
   A) double  
   B) int  
   C) final  
   D) const  
   E) static

5) What is the printout of System.out.println(‘z’ - ‘a’)?
   A) 26  
   B) a  
   C) 25  
   D) z

6) To assign a double variable d to an int variable x, you write
   A) x = (long)d  
   B) x = d;  
   C) x = (float)d;  
   D) x = (int)d;

7) Note that the Unicode for character A is 65. The expression ‘A’ + 1 evaluates to ________.
   A) B  
   B) Illegal expression  
   C) 66  
   D) A1

8) The expression (int)(76.0252175 * 100) / 100 evaluates to ________.
   A) 76.0252175  
   B) 76  
   C) 76.02  
   D) 76.03

9) Which of the following is a constant, according to Java naming conventions?
   A) read  
   B) Test  
   C) MAX_VALUE  
   D) ReadInt

10) Note that the Unicode for character A is 65. The expression “A” + 1 evaluates to ________.
    A) B  
    B) 66  
    C) A1  
    D) Illegal expression
11) If a program compiles fine, but it terminates abnormally at runtime, then the program suffers _______.
   A) a syntax error   B) a runtime error   C) a logic error

12) What is y displayed in the following code?

   public class Test1 {
      public static void main(String[] args) {
         int x = 1;
         int y = x = x + 1;
         System.out.println("y is " + y);
      }
   }

   A) y is 2 because x + 1 is assigned to x and then x is assigned to y.
   B) y is 0.
   C) The program has a syntax error since x is redeclared in the statement int y = x = x + 1.
   D) y is 1 because x is assigned to y first.

13) Analyze the following code:

   boolean even = ((231 % 2) == 0);
   if (even = true)
      System.out.println("It is even!");
   else
      System.out.println("It is odd!");

   A) The program displays "It is odd!"   B) The program has a syntax error
   C) The program has a runtime error   D) The program displays "It is even!"

14) The default case must be specified in a switch statement.
   A) true   B) false

15) The statement System.out.printf("%10s", 123456) outputs _______. (Note: * represents a space)
   A) 23456*****   B) 12345*****   C) 123456****   D) ****123456

16) Suppose x=10 and y=10 what is x after evaluating the expression (y > 10) && (x++ > 10).
   A) 10   B) 9   C) 11

17) The "less than or equal to" comparison operator in Java is _______.
   A) <   B) !=   C) <=   D) <<=   E) <=
18) Analyze the following code:

```java
String numString = JOptionPane.showInputDialog(null, "Enter a number:", "Exam Input", JOptionPane.QUESTION_MESSAGE);
int number = Integer.parseInt(numString);
if (number <= 0)
    System.out.println(number);
System.out.println(number);
```

(choose all that apply)
A) number is always printed out at least once;
B) number is printed out once if number is positive.
C) number is printed out twice if number is zero;
D) number is printed out twice if number is negative;

19) Which of the following code displays the area of a circle if the radius is positive.

A) if (radius >= 0) System.out.println(radius * radius * 3.14159);
B) if (radius != 0) System.out.println(radius * radius * 3.14159);
C) if (radius <= 0) System.out.println(radius * radius * 3.14159);
D) if (radius > 0) System.out.println(radius * radius * 3.14159);

20) What is y after the following switch statement is executed?

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

A) 1  B) 4  C) 2  D) 3

21) System.exit(0) can be used to terminate the program.

A) true  B) false
22) Analyze the following code fragments that assign a boolean value to the variable even.

Code 1:
if (number % 2 == 0)
  even = true;
else
  even = false;

Code 2:
even = (number % 2 == 0) ? true: false;

Code 3:
even = number % 2 == 0;

A) All three are correct, but Code 3 is preferred.
B) All three are correct, but Code 1 is preferred.
C) Code 3 has a syntax error, because you attempt to assign number to even.
D) Code 2 has a syntax error, because you cannot have true and false literals in the conditional expression.
E) All three are correct, but Code 2 is preferred.

23) Which of the Boolean expressions below has incorrect syntax?

A) (x != 0) || (x = 0)  B) ! (x > 0) && (x > 0)
C) (x > 0) || (x < 0)  D) (true) && (3 > 4)

24) Analyze the following code.

int x = 1;
while (0 < x) && (x < 100)
    System.out.println(x++);

A) The code does not compile because (0 < x) && (x < 100) is not enclosed in a pair of parentheses.
B) The loop runs for ever.
C) The numbers 1 to 99 are displayed.
D) The code does not compile because the loop body is not in the braces.
E) The numbers 2 to 100 are displayed.

25) What is sum after the following loop terminates?

int sum = 0;
int item = 0;
do {
    item++;
    sum += item;
    if (sum >= 4) continue;
} while (item < 5);

A) 18  B) 15  C) 16  D) 17
26) How many times will the following code print “Welcome to Java”?  

```java
int count = 0;
do {
    System.out.println("Welcome to Java");
} while (count++ < 10);
```

A) 11       B) 10       C) 9       D) 0       E) 8

27) Do the following two statements in (I) and (II) result in the same value in sum?

(I):
```java
for (int i = 0; i<10; ++i) {
    sum += i;
}
```

(II):
```java
for (int i = 0; i<10; i++) {
    sum += i;
}
```

A) Yes       B) No

28) What is the number of iterations in the following loop:

```java
for (int i = 1; i <= n; i++) {
    // iteration
}
```

A) n       B) 2*n       C) n + 1       D) n – 1

29) Will the following program terminate?

```java
int balance = 10;
while (true) {
    if (balance < 9) continue;
    balance = balance - 9;
}
```

A) Yes       B) No

30) Is the following loop correct?

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

A) Yes       B) No
31) The elements inside the for loop control are separated using semicolons instead of commas.  
A) true  
B) false

32) A break statement can be used only in a loop.  
A) true  
B) false

33) Suppose  
static void nPrint(String message, int n) {  
    while (n > 0) {  
        System.out.print(message);  
        n--;  
    }  
}  

What is the printout of the call nPrint(‘a’, 4)?  
A) aaaa  
B) aaaaa  
C) aac  
D) invalid call

34) A method can be declared with no parameters.  
A) true  
B) false

35) The actual parameters of a method must match the formal parameters in type, order, and number.  
A) true  
B) false

36) Analyze the following code:  
class Test {  
    public static void main(String[] args) {  
        System.out.println(xmethod(5));  
    }  
}

    public static int xmethod(int n, long t) {  
        System.out.println("int");  
        return n;  
    }  

def public static long xmethod(long n) {  
        System.out.println("long");  
        return n;  
    }  
}

A) The program displays int followed by 5.  
B) The program displays long followed by 5.  
C) The program runs fine but displays things other than given in A and B.  
D) The program does not compile because the compiler cannot distinguish which xmethod to invoke.
37) Each time a method is invoked, the system stores parameters and local variables in an area of memory, known as ________, which stores elements in last-in first-out fashion.
   A) storage area  B) an array  C) a stack  D) a heap

38) Which of the following is the best for generating random integer 0 or 1?
   A) (int)(Math.random() + 0.2)
   B) (int)Math.random()
   C) (int)Math.random() + 1
   D) (int)(Math.random() + 0.5)
   E) (int)(Math.random() + 0.8)

39) A variable that is declared inside a method is called ________ variable.
   A) an instance  B) a static  C) a local  D) a global  E) a class

40) Which of the following is not an advantage of using methods?
   A) Using methods makes programs run faster.
   B) Using methods hides detailed implementation from the clients.
   C) Using methods makes reusing code easier.
   D) Using methods makes programs easier to read.

41) Which of the following is incorrect? (choose all that apply)
   A) int a() = new int[2];
   B) int[] a = new int[2];
   C) int a[] = new int[2];
   D) int a = new int[2];
   E) int[] a = new int(2);

42) Given the following statement
    int[ ] list = new int[10];
    A) The array variable list contains a memory address that refers to an array of 10 int values.
    B) The array variable list contains a memory address that refers to an array of 9 int values.
    C) The array variable list contains nine values of type int.
    D) The array variable list contains ten values of type int.
43) Analyze the following code:

```java
public class Test {
    public static void main(String[] args) {
        boolean[][] x = new boolean[3][];
        x[0] = new boolean[1];
        x[1] = new boolean[2];
        x[2] = new boolean[3];

        System.out.println("x[2][2] is "+ x[2][2]);
    }
}
```

A) The program runs and displays x[2][2] is false.
B) The program has a syntax error because new boolean[3][] is wrong.
C) The program has a runtime error because x[2][2] is null.
D) The program runs and displays x[2][2] is null.
E) The program runs and displays x[2][2] is true.

44) Analyze the following code:

```java
int[][] matrix = new int[5][5];
for (int column = 0; column < matrix[4].length; column++) {
    matrix[4][column] = 10;
}
```

A) After the loop, the last row of matrix 0, 0, 0, 0, 0.
B) A syntax error, because column is not defined.
C) After the loop, the last row of matrix 10, 10, 10, 10, 10.
D) After the loop, the last column of matrix 10, 10, 10, 10, 10.
E) After the loop, the last row of matrix 0, 0, 0, 0, 10.

45) An array variable can be declared and redeclared in the same block.
A) true
B) false

46) For the binarySearch method in Section 6.7.2, what is low and high after the first iteration of the while loop when invoking binarySearch(new int[] {1, 4, 6, 8, 10, 15, 20}, 11)?
A) low is 0 and high is 6
B) low is 0 and high is 5
C) low is 3 and high is 6
D) low is 4 and high is 6
E) low is 0 and high is 3

47) What is the correct term for numbers[99]?
A) array variable
B) index
C) indexed variable
D) array
E) index variable
48) Which of the following statement is most accurate? (choose all that apply)
   A) An object may contain other objects.
   B) An object may contain the references of other objects.
   C) A reference variable refers to an object.
   D) A reference variable is an object.

49) An object is an instance of a ________.
   A) program  B) method  C) class  D) data

50) Java assigns a default value to a data member of a class if the data is not initialized.
   A) true  B) false

51) You use the plus sign (+) to denote public data or methods.
   A) true  B) false

52) The default constructor has no arguments.
   A) true  B) false

53) The default value for a data member of boolean type is true.
   A) true  B) false

54) Which of the following returns the path separator character?
   A) File.pathSeparatorChar
   B) File.pathSeparator
   C) File.separator
   D) File.separatorChar
   E) None of the above.

55) Which of following is not a correct method in Character? (choose all that apply)
   A) toUpperCase()
   B) isLetterOrDigit(char)
   C) isDigit()
   D) isLetter(char)
   E) toLowerCase(char)

56) Which of the following statements are correct to concatenate string s1 into s2. (choose all that apply)
   A) s1.concate(s2);
   B) s1 += s2;
   C) s2 += s1;
   D) s2.concate(s1);

57) What is the output of the following code?

```java
String s = "University";
s.replace("i", "ABC");
System.out.println(s);
```
   A) University
   B) UniversABCty
   C) UnABCversABCty
   D) UnABCversity
58) To check if a string s contains the suffix "Java", you may write (choose all that apply)
   A) if (s.substring(s.length() - 5).equals("Java")) ...
   B) if (s.lastIndexOf("Java") >= 0) ...
   C) if (s.charAt(s.length() - 4) == 'J' && s.charAt(s.length() - 3) == 'a' && s.charAt(s.length() - 2) == 'v' && s.charAt(s.length() - 1) == 'a') ...
   D) if (s.endsWith("Java")) ...
   E) if (s.substring(s.length() - 4).equals("Java")) ...

59) You can declare two variables with the same name in ________.
   A) a block
   B) a method one as a formal parameter and the other as a local variable
   C) two nested blocks in a method (two nested blocks means one being inside the other)
   D) different methods in a class

60) What is the printout for the first statement in the main method?

```java
public class Foo {
    static int i = 0;
    static int j = 0;
    public static void main(String[] args) {
        int i = 2;
        int k = 3;
        {
            int j = 3;
            System.out.println("i + j is " + i + j);
        }
        k = i + j;
        System.out.println("k is " + k);
        System.out.println("j is " + j);
    }
}
```

A) i + j is 6  B) i + j is 22  C) i + j is 5  D) i + j is 23

61) A constructor can access ________. (choose all that apply)
   A) A local variable defined in any method
   B) A private instance variable
   C) A static variable
   D) A public instance variable
62) What is the printout for the second statement in the main method?

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

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

A) k is 3  
B) k is 2  
C) k is 1  
D) k is 0

63) _______ can be accessed from any instance method in the class. (choose all that apply)

A) A local variable  
B) A static variable  
C) An instance variable

64) To declare a constant PI, you write

A) final static PI = 3.14159;  
B) final float PI = 3.14159;  
C) final double PI = 3.14159;  
D) static double PI = 3.14159;

65) currentTimeMills is a method in the ______ class.

A) Math  
B) Integer  
C) Double  
D) System

66) To add a value 1 to variable x, you write (choose all that apply)

A) x := 1;  
B) x = 1 + x;  
C) x = x * 1;  
D) 1 + x = x;  
E) x += 1;

67) 25 % 1 is _______.  
A) 2  
B) 3  
C) 4  
D) 0  
E) 1

68) The binary operator + is left-associative.

A) true  
B) false

69) What is x after evaluating

```java
x = (2 > 3) ? 2 : 3;
```

A) 3  
B) 5  
C) 2  
D) 4

70) You can cast a Boolean value to an int, or an int to Boolean.

A) true  
B) false
71) Analyze the following code.

```java
int x = 0;
if (x > 0) {
    System.out.println("x");
}
```

A) The symbol x is always printed.
B) The value of variable x is always printed.
C) The symbol x is always printed twice.
D) Nothing is printed because x > 0 is false.

72) Which of the following loops produces the following output? (choose all that apply)

1 2 3 4 1 2 3 1 2 1

(I) ```
for (int i = 5; i > 0; i--) {
    for (int j = 1; j < i; j++)
        System.out.print(j + " ");
    System.out.println();
}
``` (II) ```
for (int i = 1; i < 5; i++) {
    for (int j = 1; j < i; j++)
        System.out.print(j + " ");
    System.out.println();
}
``` (III) ```
int i = 0;
while (i < 5) {
    for (int j = 1; j < i; j++)
        System.out.print(j + " ");
    System.out.println();
    i++;
}
``` (IV) ```
int i = 5;
while (i > 0) {
    for (int j = 1; j < i; j++)
        System.out.print(j + " ");
    System.out.println();
    i--;
}
``` A) (IV) B) (II) C) (III) D) (I)
73) Will the following program terminate?

```java
int balance = 10;

while (true) {
  if (balance < 9) break;
  balance = balance - 9;
}
```

A) Yes
B) No

74) Assume x is 0. What is the output of the following statement?

```java
if (x > 0)
  printf("x is greater than 0");
else if (x < 0)
  printf("x is less than 0");
else
  printf("x equals 0");
```

A) x equals 0
B) x is greater than 0
C) x is less than 0
D) None

75) All Java applications must have a method ________.

A) public void main(String[] args)
B) public static Main(String args[])
C) public static void main(String[] args)
D) public static main(String[] args)
E) public static Main(String[] args)

76) You must have a return statement in a void method.

A) true
B) false

77) ________ is to implement one method in the structure chart at a time from the top to the bottom.

A) Bottom-up approach
B) Stepwise refinement
C) Bottom-up and top-down approach
D) Top-down approach

78) Consider the following statements:

```java
int[][] numbers = {{1}, {1, 2}, {1, 2, 3}};
```

What is numbers.length and what is numbers[1].length?

A) 3, 1  B) 3, 3  C) 1, 3  D) 3, 2

79) Assume int[] scores = {1, 20, 30, 40, 50}, what value does java.util.Arrays.binarySearch(scores, 3) return?

A) 0  B) -2  C) 2  D) 1  E) -1
80) Which of the following statements are true? (choose all that apply)
   A) Encapsulating data fields helps prevent programming errors.
   B) Encapsulating data fields makes the program easy to maintain.
   C) Encapsulating data fields makes the program short.
   D) Use the private modifier to encapsulate data fields.

81) ________ is a construct that defines objects of the same type.
   A) An object          B) A method          C) A data field          D) A class

82)Which class do you use to write data into a text file?
   A) PrintWriter       B) File          C) System          D) Scanner

83) Two strings with same contents are ALWAYS allocated to the same object.
   A) true          B) false

84) Analyze the following code:

   class Test {
       private double i;

       public Test(double i) {
           this.t();
           this.i = i;
       }

       public Test() {
           System.out.println("Default constructor");
           this(1);
       }

       public void t() {
           System.out.println("Invoking t");
       }
   }

   (choose all that apply)
   A) this.i may be replaced by i.
   B) this.t() may be replaced by t().
   C) this(1) must be replaced by this(1.0).
   D) this(1) must be called before System.out.println("Default constructor").

85) The internal state of an immutable class cannot be changed. String is an immutable class.
   A) true          B) false

86) You can always assign a value of long type to a variable of int type without loss of precision.
   A) true          B) false

87) The conditional operator ? : is a ________.  
   A) binary operator          B) ternary operator          C) unary operator
88) Analyze the following statement:

```java
double sum = 0;
for (double d = 0; d < 10;) {
    d += 0.1;
    sum += sum + d;
}
```

A) The program has a syntax error because the control variable in the for loop cannot be of the double type.
B) The program runs in an infinite loop because d < 10 would always be true.
C) The program compiles and runs fine.
D) The program has a syntax error because the adjustment is missing in the for loop.

89) Variables defined inside a method are called _______.
   A) local variables  B) parameters  C) global variables  D) arguments

90) _______ declares an array of char. (choose all that apply)
   A) char chars[]  B) char[] char  C) char char[]  D) char[] chars

91) How many JFrame objects can you create and how many can you display?
   A) two  B) one  C) unlimited  D) three

92) Which of the following statements are true?
   A) If a file (e.g., c:\temp.txt) does not exist, new File("c:\temp.txt") creates a new file named c:\temp.txt.
   B) If a file (e.g., c:\temp.txt) does not exist, new File("c:\temp.txt") returns null.
   C) If a directory (e.g., c:\liang) does not exist, new File("c:\liang") creates a new directory named c:\liang.
   D) If a directory (e.g., c:\liang) does not exist, new File("c:\liang") returns null.
   E) None of the above.
93) What is the printout for the third statement in the main method?

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

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

A) j is 1  B) j is 2  C) j is 0  D) j is 3

94) \(-25 \div 5\) is ________.

A) 0  B) 4  C) 2  D) 3  E) 1

95) What is the printout of the following switch statement?

```java
char ch = 'b';

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

A) abcd  B) bb  C) bbb  D) b  E) bcd

96) What the output of the following code:

```java
for (; ;)
    System.out.println("Welcome to Java");
```

A) prints out Welcome to Java one time.  B) prints out Welcome to Java forever.
C) prints out Welcome to Java two times.  D) does not print anything.
97) Each Java class must contain a main method.
   A) true  B) false

98) Consider the following statements:

   int[] numbers = new int[10];
   int[] numbers = new int[5];

   What is numbers.length?
   A) The above statements are illegal.  B) 10.
   C) undefined.  D) 5

99) What is the printout of the second println statement in the main method?

   public class Foo {
      int i;
      static int s;

      public static void main(String[] args) {
         Foo f1 = new Foo();
         System.out.println("f1.i is "+f1.i + " f1.s is "+f1.s);
         Foo f2 = new Foo();
         System.out.println("f2.i is "+f2.i + " f2.s is "+f2.s);
         Foo f3 = new Foo();
         System.out.println("f3.i is "+f3.i + " f3.s is "+f3.s);
      }

      public Foo() {
         i++;
         s++;
      }
   }

   A) f2.i is 1 f2.s is 1  B) f2.i is 1 f2.s is 2  C) f2.i is 2 f2.s is 2  D) f2.i is 2 f2.s is 1

100) What is the printout of the following code?

   String s = "Welcome to Java"
   s.replaceAll("a", "BB")
   System.out.println(s);

   A) Welcome to JBBva  B) Welcome to JavBB
   C) Welcome to JBBvBB  D) Welcome to Java
Answer Key
Testname: S2010PRACTICE1-9

1) C
2) B
3) A
4) C
5) C
6) D
7) C
8) B
9) C
10) C
11) B
12) A
13) D
14) B
15) D
16) A
17) E
18) A, B, C, D
19) D
20) C
21) A
22) A
23) A
24) A
25) B
26) A
27) A
28) A
29) B
30) A
31) A
32) B
33) D
34) A
35) A
36) B
37) C
38) D
39) C
40) A
41) A, D, E
42) A
43) A
44) B
45) B
46) D
47) C
48) B, C
49) C
50) A
51) A
52) A
53) B
54) A
55) A, C
56) C, D
57) A
58) C, D, E
59) D
60) D
61) B, D
62) B
63) B, C
64) C
65) D
66) B, C, E
67) D
68) A
69) A
70) B
71) A
72) A, D
73) A
74) A
75) C
76) B
77) D
78) D
79) B
80) A, B, D
81) D
82) A
83) B
84) B, D
85) A
86) B
87) B
88) C
89) A
90) A, D
91) C
92) E
93) C
94) A
95) C
96) B
Answer Key
Testname: S2010PRACTICE1-9

97) B
98) B
99) B
100) D