



**READ THIS NOW!**

Failure to read and follow the instructions below may result in severe penalties.

- Print your name in the space provided below.
- Print your name and ID number on the OpSCAN form; be sure to code your ID number correctly on the OpSCAN form. Code **Form A** on the OpSCAN.
- Choose the single best answer for each question — some answers may be partially correct. If you mark more than one answer to a question, you will receive no credit for any of them.
- Unless a question involves determining whether given C++ code is syntactically correct, assume that it is. Unless a question specifically deals with compiler #include directives, you should assume the necessary header files have been included.
- Be careful to distinguish integer values from floating point values (containing a decimal point). In questions/answers that require a distinction between integer and real values, integers will be represented without a decimal point, whereas real values will have a decimal point, [1044 (integer), 1044.0 (floating point)].
- **This is a closed-book, closed-notes examination. No calculators or other electronic devices may be used during this examination. You may not discuss (in any form: written, verbal or electronic) the content of this examination with any student who has not taken it. You must return this test form when you complete the examination. Failure to adhere to any of these restrictions is an Honor Code violation.**
- There are 33 equal-valued questions.
- The answers you mark on the OpSCAN form will be considered your official answers.
- When you have finished, sign the pledge at the bottom of this page and turn in the test and your OpSCAN.

**Do not start the test until instructed to do so!**

Name (Last, First) \_\_\_\_\_ printed

**Pledge:** On my honor, I have neither given nor received unauthorized aid on this examination.

\_\_\_\_\_ signature

For the next 2 questions, select the value of the given C++ arithmetic expression. Note that the presence of a decimal indicates a double value, rather than an int.

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
1) $11 / 4 + 3 / 5.0$	1	2	2.6	not allowed	none of these
2) $9 / 2 * 2 + 1$	1	9	10	3	none of these

For the next 2 questions, select the value assigned to the relevant variable, given the declarations:

```
int    IntVar;
double DecVar;
```

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
3) $DecVar = 14 / 5;$	2	2.0	2.8	3.0	none of these
4) $IntVar = 7.0 / 2;$	3	3.0	3.5	4	none of these

For the next 3 questions, suppose the (file) input stream `In` contains the following 5 lines of data (there's one tab character between columns and a newline character immediately after the last character on each line):

8	49	45	33	Bea
17	30	95	28	Goober
19	62	36	21	Floyd
6	34	82	66	Opie
55	23	72	40	Gomer

What is the value of each of the indicated variables after the execution of the following program segment?

```
int    Zero = 0, One = 1, Two = 2, Three = 3, Four = 4;
string First = "Andy", Second = "Barney", Third = "Otis";
```

```
In >> Zero >> One >> One >> Two;
In.ignore(100, '\n');
In.ignore(100, '\n');
In >> Three >> Four >> Zero;
In.ignore(100, '\t');
In.ignore(100, '\t');
In >> First;
```

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
5) One	1	49	45	17	none of these
6) Four	4	23	62	34	none of these
7) First	"Floyd"	"Goober"	"62"	"6"	none of these

For the next 4 questions, consider writing a program that must read lines of data formatted in the following way. Each line will contain a call number, followed by a tab, followed by a title, followed by a tab, followed by a category, followed by a tab, followed by year, followed by a newline:

```
<Call Number><tab><Title><tab><Category><tab><Year><newline>
```

The call numbers and titles are character strings, the category is a single word, and the years are positive integers. Assume that an input stream variable, `In`, has been opened on such a file, the current stream position is at the beginning of the file, and that the following variables have been declared:

```
string CallNumber, Title, Category;
int Year;
```

- 8) Which of the following statements will correctly read the call number into the variable `CallNumber`?
- |  |                  |
|--|------------------|
| 1) <code>getline(In, CallNumber, '\t');</code> | 5) 1 and 2 only  |
| 2) <code>getline(In, CallNumber);</code>       | 6) 1 and 3 only  |
| 3) <code>In &gt;&gt; CallNumber;</code>        | 7) 2 and 3 only  |
| 4) 1, 2 and 3                                  | 8) none of these |
- 9) Assuming that the call number, and the tab following it, and the title and the tab following it have been read, which of the following statements will correctly read the category into the variable `Category`?
- |  |                  |
|--|------------------|
| 1) <code>In &gt;&gt; Category;</code>        | 5) 1 and 2 only  |
| 2) <code>getline(In, Category);</code>       | 6) 1 and 3 only  |
| 3) <code>getline(In, Category, '\t');</code> | 7) 2 and 3 only  |
| 4) 1, 2 and 3                                | 8) none of these |

For the next 2 questions suppose the input stream contains the following data:

```
QA271_P983<tab>How to Solve It<tab>Mathematics<tab>1957<newline>
```

- 10) Which of the following would be true after the following statements were executed?
- ```
In >> CallNumber; // line 1
In >> Title;      // line 2
```
- |                                            |                   |
|--------------------------------------------|-------------------|
| 1) <code>CallNumber == "QA271"</code>      | 6) 2 and 4 only   |
| 2) <code>CallNumber == "QA271_P983"</code> | 7) 2 and 3 only   |
| 3) <code>Title == "How to Solve It"</code> | 8) 1 and 4 only   |
| 4) <code>Title == "How"</code>             | 9) 1 and 5 only   |
| 5) <code>Title == "P983"</code>            | 10) none of these |
- 11) Which of the following would be true after the following statements were executed, starting over at the beginning of the input stream?
- ```
getline(In, CallNumber, '\t'); // line 1
getline(In, Title);           // line 2
In >> Category;               // line 3
```
- |   |                                     |
|---|-------------------------------------|
| 1) <code>Category == "Mathematics"</code>   | 5) <code>Category == "Solve"</code> |
| 2) <code>Category == "\tMathematics"</code> | 6) <code>Category == "It"</code>    |
| 3) <code>Category == "How"</code>           | 7) none of these                    |
| 4) <code>Category == "to"</code>            |                                     |

For the next 2 questions, assume the input file stream `iFile` is connected to an input file whose contents are:

45D 746Q

(There's a single tab separating the 'D' from the '7'.) Consider execution of the following code fragment immediately after the file stream has been opened:

```
int i1;
char ch1 = 'x', ch2 = 'y', ch3 = 'z';
iFile >> ch1
      >> ch2
      >> i1
      >> ch3;
```

12) The resulting value of the variable `i1` would be:

- |       |       |                         |
|-------|-------|-------------------------|
| 1) 5  | 4) 7  | 7) 746                  |
| 2) 45 | 5) 6  | 8) input failure occurs |
| 3) 4  | 6) 74 | 9) none of these        |

13) The resulting value of the variable `ch2` would be:

- |                  |        |                         |
|------------------|--------|-------------------------|
| 1) '5'           | 4) '6' | 7) '\t'                 |
| 2) 'Q'           | 5) '4' | 8) input failure occurs |
| 3) ' ' (a space) | 6) '7' | 9) none of these        |

For the next 3 questions, assume the following variable declarations and initializations:

```
bool Burke = true, Hare = false;
int a = 5, b = 0, c = 3;
```

Determine the value assigned by each of the following statements to the relevant Boolean variable, or if there's something (syntactically) wrong with the expression; choose from the following answers:

- 1** true                      **2** false                      **3** syntax error                      **4** cannot be determined

14) `Hare = !Hare && !Burke;`

15) `Burke = !( !(b + a < c) || c + b == a );`

16) `Burke = (b > a) || (c > 0) && (a > b);`

For the next 4 questions, assume the input file stream `In` is connected to an input file whose contents are:

```
1.4 2.3 8 0.69 0 53
```

(There's a single space separating each adjacent pair of values.) Consider execution of the following code fragment immediately after the file stream has been opened:

```
int   anInt1 = 0;
float aFloat1, aFloat2, aFloat3;
cout << fixed << showpoint;

In >> aFloat1 >> anInt1;
cout << anInt1 << endl;           // A
cout << setprecision(3) << aFloat1 << endl; // B

In >> aFloat2 >> aFloat3;
cout << setprecision(2) << aFloat2 << endl; // C
cout << setprecision(1) << aFloat3 << endl; // D
```

17) In the statement labeled A, the value printed for the variable `anInt1` would be:

- |      |       |                  |
|------|-------|------------------|
| 1) 3 | 4) 8  | 7) 0             |
| 2) 1 | 5) 2  | 8) 53            |
| 3) 4 | 6) 69 | 9) none of these |

18) In the statement labeled B, the value printed for the variable `aFloat1` would be:

- |          |          |                  |
|----------|----------|------------------|
| 1) 1.0   | 4) 2.30  | 7) 1.40          |
| 2) 1.00  | 5) 2.300 | 8) 1.400         |
| 3) 1.000 | 6) 1.4   | 9) none of these |

19) In the statement labeled C, the value printed for the variable `aFloat2` would be:

- |         |         |                  |
|---------|---------|------------------|
| 1) 0.3  | 4) 0.00 | 7) 0.69          |
| 2) 0.30 | 5) 8.0  | 8) 0.7           |
| 3) 0.0  | 6) 8.00 | 9) none of these |

20) In the statement labeled D, the value printed for the variable `aFloat3` would be:

- |        |         |                  |
|--------|---------|------------------|
| 1) 0   | 4) 8.0  | 7) 0.69          |
| 2) 0.0 | 5) 53   | 8) 0.7           |
| 3) 8   | 6) 53.0 | 9) none of these |

21) Which of the following is not a property of an algorithm?

- |                         |                            |
|-------------------------|----------------------------|
| 1) Finiteness           | 4) Definition of sequence. |
| 2) Absence of ambiguity | 5) Feasibility             |
| 3) Low-level design.    | 6) Input                   |

22) What is the value printed for the variable `Delta` if the following code is executed?

```
int Delta = 0, X = 3;

if ( X / 2 == 1 ) {
    X++;
    Delta = Delta + X;
}

if ( Delta % X == 0 ) {
    Delta = Delta + X;
}
X++;

if ( X % 2 == 0 ) {
    Delta = Delta + X;
}

cout << "Delta = " << Delta << endl;
```

- |      |      |      |                   |
|------|------|------|-------------------|
| 1) 0 | 4) 4 | 7) 7 | 10) none of these |
| 2) 2 | 5) 5 | 8) 8 |                   |
| 3) 3 | 6) 6 | 9) 9 |                   |

For the next 3 questions, assume the declarations:

```
string Dept = "CS";
int Course = 1044;
```

23) What would be printed by the statement: `cout << Dept << Course << "is my favorite class.";`

- |                                  |                                  |
|----------------------------------|----------------------------------|
| 1) CS 1044 is my favorite class. | 4) CS1044is my favorite class.   |
| 2) CS1044ismyfavoriteclass.      | 5) The statement is not allowed. |
| 3) CS1044 is my favorite class.  | 6) none of these                 |

24) What would be printed by the statement: `cout << Dept.length();`

- |       |                                  |
|-------|----------------------------------|
| 1) CS | 4) The statement is not allowed. |
| 2) 2  | 5) none of these                 |
| 3) 3  |                                  |

25) Which of the following statements would print the name "CS", followed by the Course number, so that the value of `Course` would be right-justified to column 15, like this: (The digits on the top line are for illustration purposes only and are not intended to be part of the output).

123456789012345
CS                   1044

- |   |
|---|
| 1) <code>cout &lt;&lt; left &lt;&lt; setw(10) &lt;&lt; Dept &lt;&lt; right &lt;&lt; setw(5) &lt;&lt; Course;</code> |
| 2) <code>cout &lt;&lt; Dept &lt;&lt; setw(15) &lt;&lt; Course;</code>   |
| 3) <code>cout &lt;&lt; Dept &lt;&lt; setw(15 - Dept.length()) &lt;&lt; Course;</code>                               |

- 4) All of the above
  - 5) 1 and 2 only
  - 6) 1 and 3 only
  - 7) 2 and 3 only
  - 8) none of these
- 

26) What is the value of the variable Z after the following code is executed?

```
int W = 5, X = 9, Y = 5, Z = 1;
if (X % Y > (2 * Z)) {
    Z++;
    if (Y - 3*W < -1 * (X+1))
        Z--;
    else
        Z++;
}
else {
    Z = -1;
}
```

- 1) -1
  - 2) 0
  - 3) 1
  - 4) 2
  - 5) 3
  - 6) the code contains a syntax error
  - 7) none of these
- 

27) Which of the following represents the correct logic for a read-until-input-failure loop?

- 1) 

```
// read first data item
while ( input succeeded ) {
    // process last data read
    // read next data item
}
```
- 2) 

```
// read first data item
while ( input succeeded ) {
    // process last data read
}
```
- 3) 

```
while ( input succeeded ) {
    // process last data read
    // read next data item
}
```
- 4) 

```
while ( input succeeded ) {
    // read next data item
    // process last data read
}
```

- 5) 1 and 3 only
- 6) 2 and 4 only
- 7) none of these

Answer the following questions in the space provided. Show any work.

For the next set of questions assume the following set of declarations and initializations:

```
bool x = true, y = false;
int a = 0, b = 1, c = 2;
```

Write what the following code fragments will output when they are ran:

28)

```
if (x || b + c != a)
    cout << "Hello There" << endl;
else
    cout << "Hello Over There" << endl;
```

29)

```
if (!(y && x) && (c > b + b))
    cout << "C++ is not great" << endl;
else
    cout << "C++ is great" << endl;
```

For the following set of question write true or false:

30) Input and output for files uses the same operators and functions that the standard input and output uses.

\_\_\_\_\_

31) All main programs should return an int.

\_\_\_\_\_

32) C++ defines two constants that you can return from main, EXIT\_SUCCESS and EXIT\_FAILURE, but you can use whatever integer number you like.

\_\_\_\_\_

33) This is the best class I've ever taken on C++.

\_\_\_\_\_