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 and code your ID number and Form B correctly on the Opscan form.
• 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 laptops, 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 30 equal-valued multiple-choice 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 assigned to the relevant variable, given the declarations:

```cpp
int    intVar;
double decVar;
```

1) ```cpp
intVar = 5.6 / 2;
```  
1) 1 2 2.8 3 None of these
2) None of these

2) ```cpp
decVar = 4 / 10 + 0.6;
```  
0.0 0.4 0.6 1.0 None of these

3) What is the value of the C++ arithmetic expression given below? Note that the presence of a decimal indicates a double value, rather than an int.

```
3 / 4  +  3 / 2
```

1) 0 3) 2 5) 3
2) 1 4) 2.25 6) None of these

For the next 3 questions, assume the input file stream `iFile` is connected to an input file whose contents are:

```
73 12 9B
```
(There's a single space separating the '3' from the '1', and another separating the '2' from the '9'.) Consider execution of the following code fragment immediately after the file stream has been opened:

```cpp
int  i1, i2;
char ch1 = 'x', ch2 = 'y', ch3 = 'z';
iFile >> ch1  >> i1  >> i2  >> ch2;
```

4) The resulting value of the variable `ch1` would be:

1) '1' 4) '7' 7) ' ' (a space)
2) '2' 5) '9' 8) Input failure occurs
3) '3' 6) 'B' 9) None of these

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

1) 1 4) 7 7) 73
2) 2 5) 9 8) Input failure occurs
3) 3 6) 12 9) None of these

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

1) '3' 4) '1' 7) 'B'
2) '	' 5) '2' 8) Input failure occurs
3) ' ' (a space) 6) '9' 9) None of these
7) Which of the mathematical expressions given below is calculated by the C++ expression:

\[ 10.0 + \frac{x}{\sqrt{x^2 + 1.0}} + 4.0 \]

1) \[ \frac{10 + x}{\sqrt{x^2 + 1}} + 4 \]
2) \[ \frac{10 + x}{\sqrt{x^2 + 1 + 4}} \]
3) \[ 14 + \frac{x}{\sqrt{x^2 + 1}} \]
4) \[ \frac{14 + x}{\sqrt{x^2 + 1}} \]
5) None of these

8) Which of the C++ expressions given below would logically calculate the value of the mathematical expression:

\[ \frac{3x^2 + 5x + 1}{x + 3} \]

1) \[ \frac{3x^2 + 5x + 1}{x + 3} \]
2) \[ \frac{(3x^2 + 5x + 1)}{(x + 3)} \]
3) \[ \frac{(3x^2 + 5) + 1}{(x + 3)} \]
4) All of them
5) 1 and 2 only
6) 1 and 3 only
7) 2 and 3 only
8) None of these

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

```cpp
bool North, Poindexter = true;
int a = 5, b = -2, 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

9) North = North || !Poindexter;

10) North = ( a < b || a + b == c );

11) Poindexter = (a < b) || (b < 0) && (c > a);

12) Which of the following tasks are the responsibility of the compiler and/or linker?

1) Checking the syntax of your source code.
2) Translating your source code to machine language.
3) Checking the logic of your implementation.
4) All of them
5) 1 and 2 only
6) 1 and 3 only
7) 2 and 3 only
8) None of these
For the next 4 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 visible character on each line):

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>23</td>
<td>72</td>
<td>40</td>
<td>Gomer</td>
</tr>
<tr>
<td>17</td>
<td>30</td>
<td>95</td>
<td>28</td>
<td>Goober</td>
</tr>
<tr>
<td>6</td>
<td>34</td>
<td>82</td>
<td>66</td>
<td>Opie</td>
</tr>
<tr>
<td>19</td>
<td>62</td>
<td>36</td>
<td>21</td>
<td>Floyd</td>
</tr>
<tr>
<td>8</td>
<td>49</td>
<td>45</td>
<td>33</td>
<td>Bea</td>
</tr>
</tbody>
</table>

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

```cpp
int Zero = 0, One = 1, Two = 2, Three = 3, Four = 4;
string First = "Andy", Second = "Barney", Third = "Otis";
In.ignore(INT_MAX, '\n');
In.ignore(INT_MAX, '\t');
In >> Zero >> One >> Two;
In >> First >> Three >> Four;
In.ignore(INT_MAX, '\t');
In >> Zero;
In.ignore(INT_MAX, '\n');
In >> Second;
```

1. Zero 6 34 82 36 None of these
2. Four 6 34 82 36 None of these
3. First "Andy" "Goober" "62" "6" None of these
4. Second "Opie" "\n19" "1" "Floyd" None of these

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

```cpp
int W = 7, X = 9, Y = 5, Z = 0;
if ( X + Y >= 2 * W ) {
    Z = Z + 5;
    if (Y - 3*W < -2*X)
        Z = Z + 2;
    else
        Z = Z - 3;
} else {
    Z = -1;
}
```

1) -1 2) 0 3) 2 4) 4 5) 5 6) 6 7) The code contains a syntax error 8) None of these
For the next 3 questions, consider writing a program that must read lines of data formatted in the following way. Each line will contain the description of a catalog item, followed by a tab, followed by the price of a single unit of that item, followed by a tab, followed by a shipping code, followed by a tab, followed by the number of units ordered, followed by a newline:

<Item description><tab><Price><tab><Shipping code><tab><Quantity><newline>

The description and shipping code are character strings, which may contain any character other than a tab, the price is a nonnegative decimal value, and the quantity is a nonnegative integer. 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:

```cpp
string Description, ShippingCode;
int Dollars, Cents, Quantity;
char DecimalPoint;
```

18) Which of the following statements will correctly read the first description into the variable Description?

1) `In >> Description;`
2) `getline(In, Description, '\t');`
3) `getline(In, Description);`
4) 1, 2 and 3
5) 1 and 2 only
6) 1 and 3 only
7) 2 and 3 only
8) None of these

19) Assuming that the first description, and the tab following it have been read, which of the following code fragments will correctly read the first price into the appropriate variable(s) declared above?

1) `In >> Dollars;`
2) `getline(In, Dollars, '.');
   In.ignore(1, '.');`
3) `In >> Dollars;
   In.ignore(1, '.');`
4) 1, 2 and 3
5) 1 and 2 only
6) 1 and 3 only
7) 2 and 3 only
8) None of these

20) Suppose the input stream contains the following specific data (the 'C' is the first character in the stream):

```
C++ in 30 Seconds<tab>39.95<tab>Available<tab>10
```

What would be true after the following statements were executed?

```cpp
getline(In, Description, '\t'); // Line 1
In >> Dollars >> DecimalPoint >> Cents; // 2
In.ignore(INT_MAX, '\t'); // 3
getline(In, Shippingcode, '\t'); // 4
```

1) Description == "C++ in 30 Seconds"
2) Description == "C++ in 30 Seconds\t"
3) ShippingCode == "Available"
4) ShippingCode == "Available\t"
5) 1 and 3 only
6) 1 and 4 only
7) 2 and 3 only
8) 2 and 4 only
9) None of these
21) Suppose that \(A\), \(B\) and \(C\) are three int variables. Which of the following C++ Boolean expressions would be true if and only if the value of \(A\) is (strictly) the largest of the three?

1) \((A > B) \&\& (A > C)\)
2) \(! (A <= B) \&\& ! (A <= C)\)
3) \(! ( (A <= B) || (A <= C) )\)
4) All of them
5) 1 and 2 only
6) 1 and 3 only
7) 2 and 3 only
8) None of these

22) Suppose that \(A\), \(B\) and \(C\) are three int variables. Which of the following C++ Boolean expressions would be true if and only if the value of \(B\) is (strictly) between the values of \(A\) and \(C\)?

1) \((A > B > C) \lor (A < B < C)\)
2) \(( (A > B) \&\& (B > C) ) \lor ( (A < B) \&\& (B < C) )\)
3) \(( (A > B) \lor (A > C) ) \&\& ( (A < B) \lor (A < C) )\)
4) All of them
5) 1 and 2 only
6) 1 and 3 only
7) 2 and 3 only
8) None of these

23) Which of the following C++ expressions would evaluate to 0.75?

1) \(3 / 4\)
2) \(3.0 / 4\)
3) \(\text{double}(3 / 4)\)
4) \(\text{double}(3) / 4\)
5) All of them
6) 1 and 2 only
7) 2 and 4 only
8) 3 and 4 only
9) 2, 3 and 4 only
10) None of these

For the next 2 questions, consider execution of the following switch statement:

```cpp
int Enter = 10;
cin >> Enter;

switch ( Enter ) {
    case 1:   Enter = -4;
    case 2:   Enter = -6;
    case 4:   break;
    case 6:   Enter = -8;
    default:  Enter = -1;
}
```

What would the value of \(\text{Enter}\) be after execution of this code if the given value were read for \(\text{Enter}\)?

<table>
<thead>
<tr>
<th>Value read</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
<td>-1</td>
<td>-4</td>
<td>-6</td>
<td>-8</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>None of these</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>-1</td>
<td>-4</td>
<td>-6</td>
<td>-8</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>None of these</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
26) Which of the following represent the correct design pattern for reading and processing data until input failure?

1) while input stream is OK do
   try to read data
   process data
   endwhile

2) try to read data
   while input stream is OK do
   process data
   try to read data
   endwhile

3) try to read data
   while input stream is OK do
   process data
   endwhile

4) while input stream is OK do
   process data
   try to read data
   endwhile

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

27) Consider the following C++ code fragment, where \( x \) and \( y \) are int variables:

   ```cpp
   if ( x == y )
       cout << "executing if clause" << endl;  // Line 1
   else
       cout << "executing else clause" << endl; //  2
   ```

Which of the following statements about this code fragment are true?

1) If \( x \) is 5 and \( y \) is 5, then Line 1 is executed and Line 2 is not.
2) If \( x \) is 5 and \( y \) is 5, then Line 2 is executed and Line 1 is not.
3) If \( x \) is 5 and \( y \) is 10, then Line 1 is executed and Line 2 is not.
4) If \( x \) is 5 and \( y \) is 10, then Line 2 is executed and Line 1 is not.
5) 1 and 3 only
6) 1 and 4 only
7) 2 and 3 only
8) 2 and 4 only
9) None of these

28) Consider the following C++ code fragment, where \( x \) is an int variable:

   ```cpp
   if ( x > 10 ) {
       x = 5;
   }  
   else {
       x = 15;
   }
   cout << x << endl;
   ```

Which of the following statements about this code fragment are true?

1) If \( x \) is initially 12, then the value 5 is written.
2) If \( x \) is initially 12, then the value 12 is written.
3) If \( x \) is initially 12, then the value 15 is written.
4) If \( x \) is initially 7, then the value 5 is written.
5) If \( x \) is initially 7, then the value 7 is written.
6) If \( x \) is initially 7, then the value 15 is written.
7) 1 and 6 only
8) 2 and 5 only
9) 3 and 4 only
10) None of these
29) Which of the following would write the data "$ 47.05" (not including the quotes, and one space after the dollar symbol) to cout, given the variables:

```cpp
int Dollars = 47,
    Cents = 5;
```

1) `cout << '$' << setw(3) << Dollars << '.' << setw(2) << Cents;`
2) `cout << '$' << setw(3) << Dollars << '.' << setw(2) << setfill('0') << Cents;`
3) `cout << '$' << setw(3) << setfill('0') << Dollars << '.' << setw(2) << Cents;`
4) All of them
5) 1 and 2 only
6) 1 and 3 only
7) 2 and 3 only
8) None of these

30) Given the variables:

```cpp
string Item = "C++ in 15 Minutes";
int    Units = 10;
```

which of the following code fragments would produce the output below? (The first line is just to indicate how things are spaced, and is not actually part of the output.)

```
123456789012345678901234567890
10           C++ in 15 Minutes
```

1) `cout << Units << setw(28) << right << Item;`
2) `cout << setw(10) << Units << setw(20) << right << Item;`
3) `cout << setw(10) << left << Units << setw(20) << right << Item;`
4) All of them
5) 1 and 2 only
6) 1 and 3 only
7) 2 and 3 only
8) None of these