



**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 B** on the Opscan.
- Read the questions and the code **carefully!** There are plenty of places where the code **looks** like it's doing one thing, when in reality it's doing another because of an intentional "error".
- 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)]. There will be no distinction made between a *float* and a *double*.
- **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 40 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 each of the following 4 questions, what is the result of the arithmetic expression?

	1	2	3	4	5
1) $2 / 4 - 2$	-1.5	-1	2	-1	None of them
2) $3.0 + 12 / 3.0$	5	3.0	5.0	7.0	None of them
3) $4.0 * 2 \% 3$	2	8.0	2.0	Error	None of them
4) $4 / 2 + 4 \% 5$	3	6	2.8	Error	None of them

For the next three questions, what is the final value stored in variable?

```
int Num;
float Real;
```

	1	2	3	4	5
5) $Real = 10 \% 3;$	1	3.3	1.0	Error	None of them
6) $Num = 3 / 2 * 10.0;$	10.0	15	0.2	0.15	None of them
7) $Num = 5.0 / 2.0;$	2.5	3	2.0	2	None of them

8) What are the values of each variable after the following code is executed?

```
int i = 3;
int j = 2;
int k = 7;
int m = 4;

m += ++i * --j + k++;
```

- 1)  $i == 4, j == 1, k == 8, m == 16$
- 2)  $i == 4, j == 3, k == 8, m == 23$
- 3)  $i == 3, j == 2, k == 7, m == 13$
- 4)  $i == 4, j == 1, k == 8, m == 12$
- 5)  $i == 4, j == 1, k == 8, m == 15$

9) Attempting to divide by zero is an example of what kind of error?

- 1) Linker
- 2) Logical
- 3) Syntax
- 4) Runtime

10) A compiler takes \_\_\_\_\_ and generates \_\_\_\_\_.

- 1) machine language, object code
- 2) assembly language, machine language
- 3) high level language, machine language
- 4) machine language, executable code
- 5) high level language, assembly language

What is the result of each of the following boolean expressions (On the OpScan, 1 is True and 2 is False)?

```
int x = 2, y = 10, z = -3;
char ch1 = 'c', ch2 = 's';
boolean Done = false;
```

- 11)  $ch1 < ch2 \ \&\& \ (x == 2) \ || \ Done$
- 12)  $!(z < y - 10)$
- 13)  $(x + y) < 12 \ \&\& \ !Done$

14) Given the following input file, *input.dat*, how many times is the body of the loop going to be executed?

```
10
100
1000
10000
100000
1000000
```

```
int Num1 = 0;
int Num2 = 0;

ifstream In;
In.open("input.dat");

while (In) {
    In >> Num1;
    In >> Num2;

    cout << Num1 + Num2 << endl;
}
```

- 1) 7
- 2) 6
- 3) 0
- 4) 4
- 5) 1
- 6) 3
- 7) Infinitely

15) What code could be inserted into the *for* loop in order to print out 10 asterisks?

```
for ( _____ ) {
    cout << '*';
}
```

- 1) `int i = 0; i <= 10; i++`
- 2) `int i = 1; i <= 10; i++`
- 3) `int j = 0; j < 10; j++`
- 4) `int j = 0; j < 10; j = j + 1`
- 5) Both 1 and 2
- 6) Both 2 and 3
- 7) 2, 3, and 4
- 8) All of the above

Given the following code:

```
int a = 2;
int b = 4;
int c = 7;
int d;

if (a < b ) {
    a = 2 * b;

    if (a < c) {
        b = 3;
    }
    else if (c < 10) {
        b = 2;
    }

    if (a < 10) {
        c = 11;
    }
}
else {
    if (c > a)
        d = 27;
    else
        d = 15;

    a += 10;
    c = a + 4;
    b = d + 2
}
```

- 16) What is the value of *a* after the code has executed?  
1) 8            2) 10            3) 2            4) 14            5) None of the above
- 17) What is the value of *b* after the code has executed?  
1) 2            3) 4            3) 3            4) Unknown    5) None of the above
- 18) What is the value of *c* after the code has executed?  
1) 12           2) 7            3) 11           4) 6            5) None of the above
- 19) What is the value of *d* after the code has executed?  
1) 27           2) 0            3) 15           4) Unknown    5) None of the above

20) What will be the output of the following code:

```
int Num = 42;

cout << Num;

if (Num % 5 == 0)
    cout << " is divisible by 5";
    if (Num % 2 == 0)
        cout << " and is also divisible by 2.";
else
    cout << " is not divisible by 5.";
```

- 1) 42 is not divisible by 5.
- 2) 42
- 3) 42 is divisible by 5 and is also divisible by 2.
- 4) 42 and is also divisible by 2.
- 5) 42 is divisible by 5 is not divisible by 5.
- 6) None of the above

---

21) What following code contains what kind of error(s):

```
const double RATE = 0.08;
string State = "Virginia";
double Price = 4.50;

if (State = "California") {
    cout << Price * RATE;
}
else {
    cout << "Unknown rate" << endl;
}
```

- 1) Linker
- 2) Runtime
- 3) Logical
- 4) Compiler
- 5) Both 2 and 4
- 6) Both 2 and 3
- 7) There are no errors

---

22) What will be the output of the following code:

```
string First = "We all live";
string Second = "in a yellow submarine";

cout << First + Second;
```

- 1) We all live in a yellow submarine
- 2) We all livein a yellow submarine
- 3) We all live + in a yellow submarine
- 4) We all live+in a yellow submarine
- 5) Syntax error - this statement is illegal

For the next 6 questions, you are given the following input file, *input.dat*, and code. The file has information divided into three columns (an ID number, a city name, and a state) that are separated by tabs.

1	Atlanta	Georgia
2	Geneva	New York
3	New York	New York

```
int ID1 = 0, ID2 = 0, ID3 = 0;
string City1 = "", City2 = "", City3 = "",
        State1 = "", State2 = "", State3 = "";
```

```
ifstream In;
In.open("input.dat");
```

```
In >> ID1 >> City1 >> State1;
```

```
In >> ID2 >> City2;
getline(In, State2, '\n');
```

```
In >> ID3 >> City3;
getline(In, State3, '\n');
```

- 23) After the code executes, what will be the contents of City1?  
 1) "\t"      2) "Atlanta"      3) "\tAtlanta"      4) "\tAtlanta\t"  
 5) Empty      6) "Atlanta\t"
- 24) After the code executes, what will be the contents of State1?  
 1) "\t"      2) "Georgia"      3) "Georgia\n"  
 4) "\tGeorgia\n"      5) Empty
- 25) After the code executes, what will be the contents of City2?  
 1) "\tGeneva"      2) "Geneva\t"      3) "\t"  
 4) "Geneva"      5) Empty
- 26) After the code executes, what will be the contents of State2?  
 1) "New York"      2) "New"      3) "\tNew York"      4) "New York\n"  
 5) "\tNew "      6) Empty
- 27) After the code executes, what will be the contents of City3?  
 1) "\tNew York"      2) "New York"      3) "\tNew"      4) "New"  
 5) Empty
- 28) After the code executes, what will be the contents of State3?  
 1) "New York"      2) "York"      3) "\tNew York"  
 4) " York\tNew York"      5) "York\tNew York"      3) " York"      7) Empty

29) You are given the following input stream, *In* (there is no additional whitespace other than the tabs), and code. After the code is executed, what is the value of *Sum*?

12\t 23\t 17\t 0\t 6\t -1\t 17

```
int Num;
int Sum = 0;

In >> Num;

while (Num > 0) {
    if (Num % 2 != 0) {
        Sum = Num + Sum;
    }

    In >> Num;
}
```

- 1) 74          2) 18          3) 58          4) 52          5) None of the above

For the next 3 questions, you are given the following input stream, *In* (there is no additional whitespace other than the tabs and newline), and code:

-7.4\t\t3.4\n 27\t -4

```
int Num;
float RealNum;
char Ch;

In.ignore(100, '\t');
In >> Num;
In.ignore(5, '\n');
In >> RealNum;
_____;
```

30) After this code is executed, what is the value of *Num*?

- 1) 3          2) -4          3) '\t'          4) -7  
5) 3.4          6) None of the above

31) After this code is executed, what is the value of *RealNum*?

- 1) 0.4          2) 2.0          3) 27.0          4) 27  
5) Error          6) None of the above

32) Assuming that everything up to and including the 27 was successfully extracted from the stream, what code could be added in the blank to read the final '\t'?

- 1) cin.get(Ch)          2) In >> Ch;          3) In.get(Ch)  
4) getline(In, Ch, '\t')          5) 3 and 4          6) None of the above

33) What will be the output after the following code is executed:

```
string Str1 = "Tuba";
string Str2 = "or not Tuba";
string Str3 = Str1 + " " + Str2;

cout << Str3.length();
```

- 1) 4            2) 15            3) 18            4) 16            5) 11

34) Given the following code, how many exclamation points will be printed:

```
const char POINT = '!';
const int MAX = 20;

int Count = 0;

while (Count < MAX ) {
    cout << POINT;
}
```

- 1) 20            2) 19            3) 0  
4) Infinite (loop doesn't terminate)            5) None of the above

---

The next three questions refer to the following switch statement:

```
char Ch;

cin >> Ch;

switch (Ch) {
    case 'A':
    case 'E':
    case 'I':    cout << "First half";
                break;

    case 'O':
    case 'U':    cout << "Second half";
                break;

    default:    "Wrong!";
                break;
}
```

35) If the character 'O' was entered at the keyboard, what would be the output?

- 1) First half      2) Second half      3) Wrong!      4) There would be no output

36) If the character 'a' was entered at the keyboard, what would be the output?

- 1) First half      2) Second half      3) Wrong!      4) There would be no output

(Continued on the next page)

37) Which of the following *if-else* statement(s) are equivalent to the switch statement?

- 1) 

```
if (Ch == 'A' && Ch == 'E' && Ch == 'I')
    cout << "First half";
else if (Ch == 'O' && Ch == 'U')
    cout << "Second half";
else
    cout << "Wrong!";
```
  - 2) 

```
if (Ch == 'A' || Ch == 'E' || Ch == 'I') {
    cout << "First half";

    if (Ch == 'O' || Ch == 'U')
        cout << "Second half";
    else
        cout << "Wrong!";
}
```
  - 3) 

```
if (Ch == 'A' || Ch == 'E' || Ch == 'I')
    cout << "First half";
else if (Ch == 'O' || Ch == 'U')
    cout << "Second half";

cout << "Wrong!";
```
  - 4) 

```
if (Ch == 'A' || Ch == 'E' || Ch == 'I')
    cout << "First half";
else if (Ch == 'O' || Ch == 'U')
    cout << "Second half";
else
    cout << "Wrong!";
```
  - 5) Both 2 and 3
  - 6) Both 3 and 4
  - 7) None of the above
- 

38) A switch statement can be used with a variable that is a(n):

- 1) int          2) float      3) char      4) string    5) double
- 5) 1, 2, 3, and 5      6) Both 1 and 3      7) 1, 3, and 4
- 8) All of the above

39) What is the hardest type of error to find?

- 1) Linker                  2) Logical                  3) Syntax                  4) Runtime

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

- 1) 

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

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

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

```
// read first data item  
while ( input succeeded ) {  
    // process last data read  
}
```
- 5) 1 and 3 only
- 6) 2 and 4 only
- 7) None of these