

The following exam is pledged. All answers are to be done on the answer sheet that is provided. The test is closed book and closed note.

1. What are the values of the following legal C++ expressions?

- (a) $10 - 5 * 4$
- (b) $6 - 7 + 4 / 5$
- (c) $32 \% 10$
- (d) $(3 + 10) / 3$

2. Identify the items that are legal C++ object identifiers.

- | | |
|---------------|---------------|
| (a) IfGood | (e) foo.float |
| (b) float | (f) final_4 |
| (c) forget | (g) letter.10 |
| (d) letterTen | (h) 2letter |

3. Given these declarations:

```
int i1 = 4;
int i2 = 3;
float f1 = 3.0;
```

Evaluate these expressions:

- | | |
|------------------|---|
| (a) $i1 * (1/2)$ | = |
| (b) $i2 * 1 / 2$ | = |
| (c) $i2 * 0.5$ | = |
| (d) $2.5 * f1$ | = |

4. Give a boolean expression using an integer object `year` that is true if and only if the value of `year` is in the inclusive range 1900 through 1999.

5. When does the following correct code segment terminate?

```
cout << "Please provide numbers: " << flush;
int c1;
for (int n = 0; cin >> c1; ++n) {
    cout << c1 << endl;
}
```

6. A constant object:

- (a) is the same as a numeric object.
- (b) can only be given a value in its definition.
- (c) can only be assigned a value once using an assignment statement.
- (d) can only appear on the left-hand-side of an assignment statement.
- (e) (c) and (d).

7. Three attributes of an object are name, type and value. *Not considering any issues about programming style in C++:*

- (a) Does the choice of an object's type determine the choice of its name in C++? If so, how?
- (b) Does the choice of an object's name determine the choice of its value in C++? If so, how?
- (c) Does an object's type determine the values that can be assigned to that object? If so, how?

8. Consider the following code segment using **bool** objects A, B, C, and D .

```
if (A && B)
    if (!C || !D)
        cout << "1" << endl;
    else
        cout << "2" << endl;
else
    cout << "3" << endl;
```

Give values for A, B, C, and D that cause the preceding code segment to display "2" to the standard output stream cout.

9. What base ten integer is represented by the base two number 00001011?

10. Write down the eight-bit, two's complement version of the base ten number -45.

11. The following code segment is supposed to display the sum of the odd integers in the range 1 ... n. What should the if test expression be to accomplish this task?

```
int Sum = 0;
for (int i = 1; i <= n; ++i) {
    if ( ????? ) {
        Sum = Sum + i;
    }
}
cout << Sum << endl;
```

12. The output statement in the following loop will be executed how many times?

```
for (int i = 0; i < 10; i++)
    for (int j = 0; j < 2; j++)
        for (int k = j; k < 2; k++)
            cout << "How many times?" << endl;
```

- (a) 30
- (b) 20
- (c) 40
- (d) 66
- (e) 99

13. What is printed by the following code fragment?

```
int i = 2;
int j = 3;
i += j + j;
j *= i * 1.5;
cout << "i = " << i << "    j = " << j << endl;
```

- (a) i = 6 j = 3
- (b) i = 6 j = 9
- (c) i = 8 j = 36
- (d) i = 9 j = 36
- (e) i = 8 j = 24

14. What is the likely programming error in the following code segment?

```
if (i = ListSize) {
    cout << "We are all done" << endl;
}
```

15. Write the truth table for the logical binary operation of isomorphism (*iso*). The *iso* operation evaluates to true if the operands have the same value; otherwise, *iso* evaluates to false.

16. True or False In a **while** statement if the test expression is initially false then the action of the construct is never executed, otherwise the action is repeatedly executed until the test expression evaluates to false.

17. True or False The **for** statement is a generalization of the **while** construct that besides having a test expression also has both a one-time loop initialization action and an action that is to be performed once for each execution of the loop body.

18. What happens in the following loop?

```
for (int n = 1; n > 0; n = n * 10) {
    cout << "Value of n is: " << n << endl;
}
```

- (a) The loop never terminates, printing out larger and larger values of *n*.
- (b) The loop never terminates, printing out the same value of *n* over and over again.
- (c) The loop never terminates, and doesn't print out anything.
- (d) The loop terminates when *n* overflows; some values for *n* are printed.
- (e) The loop terminates when *n* = 10.

19. The following definitions are in effect.

```
bool P = false;  
bool Q = true;  
bool R = true;
```

Evaluate the following expressions

- (a) $P \ \&\& \ (Q \ || \ R)$
- (b) $!!P$

20. Provide a complete, syntactically correct program following class guidelines that prompts its user to provide ten integer values. The values are to be extracted within a **for** loop and when the loop is finished your program should display the number of input values that were less than zero.