Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Score:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**ECE 2036 Test II**

Open book and notes, PCs and tablets allowed, but no Internet Access and code cannot be run on a PC

1. (*10%*) Assuming the short C/C++ code segment below compiles, what is output?

string str("Hello C/C++ String World");

string mystr;

mystr=str.substr(6,6);

cout << mystr << hex << str.length() << str[6] << mystr.length();

cout.put(65).put(66);

cout << endl;

Output: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. (*5%*) What happens if an exception is thrown outside of a try block?
2. (*15%)* Write a C/C++ template definition that automatically generates a function called “smaller” that returns the smaller of two values of the same type (i.e., small(2, 3) returns 2 or small(3.0, 2.0) returns 2.0). You can assume that the “<” operator is defined for any type that is used with the template.
3. (*5%*) C uses the two functions \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ for dynamic memory

management, and C++ uses \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ . If these do not match up during program execution so that any dynamically allocated memory is returned when no longer

needed, a type of error occurs that is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_.

1. (*10%*) If a new class definition needs dynamic memory allocation, the user also typically needs to

provide (i.e., not use the default) code for the classes’ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,

\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It is also likely that the user

will want to overload the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ operator (first before the other operators).

1. (*10%*) In a class that uses dynamic memory allocation for member data, assuming “A=B;” works some special code is also needed so that a statement like “A=A;” will work properly (i.e., A and B are objects from the new class).

This is called \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and code to handle it is typically

placed in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ overload.

Write a C++ statement in the space below that is typically added to solve the “A=A;” problem.

1. (*5%*) If only a pointer is passed to an object that is from a derived class that contains virtual functions, how does the program find the correct virtual function code at runtime?
2. (*20%*) Write the output in the space below that is produced by the Constructor Destructor example C/C++ code provided with the test. Recall that most compilers use the copy constructor to make a new copy of the object whenever pass by value is used (instead of a pass by reference). Assume this happens when a function returns a value.
3. (*20%*) Write the output in the space below that is produced by the Inheritance and Polymorphism example C/C++ code provided with the test.