

(1) [12 points]

True or False Questions.

Suppose we have the following inheritance specified in a library file.

```
class A { /* public, protected, and private data and functions*/}
class B : protected A { /* public, protected, and private data and functions*/}
class C : private B { /* public, protected, and private data and functions*/}
```

- (a) **True or False** A base class is type-compatible with a derived class.
- (b) **True or False** A derived class is type-compatible with a base class when protected inheritance is used.
- (c) **True or False** When argument objects are passed to a function by value, a copy constructor is called.
- (d) **True or False** When public inheritance is used, only public functions of the derived class, but none from the base class are available to client classes.
- (e) **True or False** Class C may access all the protected and public data and functions of Class A and Class B.
- (f) **True or False** All clients of class B can only access the public data and functions of class B only and none of class A.

(2) [12 points]

Multiple Choice Questions.

```
// class SampleClass defined in SampleClass.h
SampleClass A; /*1*/
SampleClass B = A; /*2*/
B = A; /*3*/
```

- (a) In the line above labeled /*2*/ what function is called? Select one.
 - (a) Copy constructor
 - (b) Assignment operator
 - (c) Default constructor
- (b) In the line above labeled /*3*/ what function is called? Select one.
 - (a) Copy constructor
 - (b) Assignment operator
 - (c) Default constructor
- (c) Which of the following prototypes demonstrates best practices for writing a copy constructor for the ClassA? Choose the best answer
 - (a) ClassA(ClassA& copy);
 - (b) ClassA(const ClassA& copy);
 - (c) ClassA(const ClassA copy);
- (d) ClassB dynamically allocates an array of integers in its constructor. In addition to a default constructor, what are the smallest set of functions that ClassB should implement to avoid memory leaks?
 - (a) ClassB should implement a destructor.
 - (b) ClassB should implement an assignment operator and destructor.
 - (c) ClassB should implement a copy constructor, assignment operator, and destructor.
- (e) In the class LinkedList a student has placed the following prototype for overloading the insertion operator:
`friend ostream& operator<< (ostream& o, const LinkedList &ll);`
Select all statements that are true about this prototype
 - (a) The function will not be able to access private data and functions of the Linked List class.
 - (b) The function may change the LinkedList passed a parameter to print.
 - (c) The ostream may be modified for the insertion.
 - (d) Chaining insertion calls will be possible. (Chaining example: cout << list1 << list2;)
- (f) Private data of a base class may be initialized in the following ways: (Circle all that apply)
 - (a) By calling the constructor of the base class within the constructor of the derived class
 - (b) By calling the constructor of the base class within the initialization list of the constructor of the derived class
 - (c) By setting the data directly within the constructor of the derived class since the derived class has a copy of it also.