University of Eswatini

Department of Computer Science

Resit Examination

2018/19

Title of Paper: Object Oriented Programming

Course Number: CSC242

Time Allowed: Three (3) hours

Instructions: Answer **ALL** questions

You are not allowed to open this paper until you have been told to do so by the invigilator.

Part I – OPP Basic Concepts

QUESTION ONE (18 marks)

Discuss the following concepts using examples:

1.1) Data Abstraction {3 marks}

1.2) Function overloading {3 marks}

1.3) Superclass {3 marks}

1.4) Mutator Function {3 marks}

1.5) Object {3 marks}

1.6) Interface {3 marks}

Part I I – True or false

QUESTION TWO (15marks)

Indicate whether the statement is true or false.

2.1) In C++, class is a not reserved word and it defines only a data type. {1 mark}

2.2) In C++ terminology, a class object is the same as a class instance. {1 mark}

2.3) Given the declaration

```
class myClass
{
public:
   void print();  //Output the value of x;
   MyClass();

 private:
```

```
  int x;
};

myClass myObject;
```

The following statement is legal.

```
myObject.x = 10;
```

{1 mark}

2.4) If the derived class does not override a public member function of the base class, you may specify a call to that public member function by using the name of the function and the appropriate parameter list.

{1 mark}

2.5) Variables that are created during program execution are called static variables.

{1 mark}

2.6) A memory leak is an unused memory space that cannot be allocated.

{1 mark}

2.7) Operators can be overloaded either for objects of the user-defined types, or for a combination of objects of the user-defined type and objects of the built-in type.

{1 mark}

2.8) A friend function does not have access to the private data members of the class.

{1 mark}

2.9) When writing the definition of a friend function, the name of the class and the scope resolution operator precede the name of the friend function in the function heading.

{1 mark}

2.10) Both parameters of the function to overload the operator << are reference parameters.

{1 mark}

2.11) One of the typical ways of dealing with exceptions is to use an if statement.

{1 mark}

2.12) The heading of a try block can contain ellipses in place of a parameter.

{1 mark}

2.13) If no exception is thrown in a try block, all catch blocks associated with that try block are ignored.

{1 mark}

2.14) If the catch block with an ellipses (in the heading) is needed, then it should be the first catch block in a sequence of try/catch blocks.

{1 mark}

2.15) C++ provides all the exception classes you will ever need.

{1 mark}

Part III – Multiple Choice

QUESTION THREE (15 marks)

Identify the choice that best completes the statement or answers the question.

3.1) If a member of a class is ____, you cannot access it outside the class.

a. public
b. automatic
c. private
d. static

Figure 1:

clockType
-hr: int -min: int -sec: int
+setTime(int, int, int): void +getTime(int&, int&, int&) const: void +printTime() const: void +incrementSeconds(): int +incrementMinutes(): int +incrementHours(): int +equalTime(const clockType&) const: bool

{1 mark}

3.2) Consider the UML class diagram shown in the accompanying figure. According to the UML class diagram, how many private members are in the class?

a. none
b. zero
c. two
d. three

{1 mark}

3.3) If the corresponding functions in the base class and the derived class have the same name but different sets of parameters, then this function is ____ in the derived class.

a. reused
b. redefined
c. overloaded
d. overridden

{1 mark}

3.4) Which of the following statements about inheritance is true if memberAccessSpecifier is protected?

a. The private members of the base class become protected members of the derived class.
b. The derived class can directly access any member of the base class.
c. The public members of the base class become protected members of the derived class.
d. The protected members of the base class become private members of the derived class.

{1 mark}

3.5) ____ is the ability to use the same expression to denote different operations.

a. Inheritance
b. Encapsulation
c. Polymorphism
d. Composition

{1 mark}

3.6) In C++, ____ is called the address of operator.

a. &
b. *
c. #
d. ->

{1 mark}

3.7) Which of the following can be used to initialize a pointer variable?

a. 1
b. NULL
c. "0"
d. '0'

{1 mark}

3.8) In C++, virtual functions are declared using the reserved word ____.

a. virtual
b. private
c. public
d. struct

{1 mark}

3.9) A(n) ____ function is a nonmember function that has access to all members of the class.

a. access
b. protected
c. friend
d. void

{1 mark}

3.10) Which of the following is a built-in operation on classes?

a. increment
b. assignment
c. decrement
d. relational

{1 mark}

3.11) Which of the following is the general syntax of the function prototype to overload the pre-increment operator ++ as a member function?

a. className operator++();

b. className operator++(int);
c. friend className operator++();
d. friend className operator++(int);

{1 mark}

3.12) Which of the following is the general syntax of the function prototype to overload the post-increment operator as a member function?

a. className operator++();
b. friend className operator++();
c. className operator++(int);
d. friend className operator++(int);

{1 mark}

3.13) Which of the following is a valid C++ statement?

a. assert(0 = divisor);
b. assert(divisor != 0);
c. assert(divisor 0);
d. assert(divisor is 0);

{1 mark}

3.14) A catch block can have, at most, _____ catch block parameter(s).

a. zero
b. one
c. two
d. three

3.15) Which of the following statements throws a valid exception in C++?

a. throw.function();
b. throw 2;
c. throws str;
d. 4 throw;

{1 mark}

Part IV – Coding

QUESTION FOUR (32 marks)

4.1) Every circle has a centre and a radius. Given the radius, we can determine the circle's area and circumference. Given the centre, we can determine its position in the x-y plane. The centre of the circle is a point in the x-y plane.

Design a class, circleType, that can store the radius and centre of the circle. You should be able to perform the usual operations on the circle, such as setting the radius, printing the radius, calculating and printing the area and circumference, and carrying out the

usual operations on the centre. Also, write a program to test various operations on a circle. {25 marks}

4.2) Create a UML diagram for this class (circleType) {7 marks}

QUESTION FIVE {20 marks}

5.1) Illustrate how to add two complex numbers using operator overloading. {10 marks}

5.2) Write a program to display smallest among two numbers using function templates. {10 marks}