EGERTON UNIVERSITY

UNIVERSITY EXAMINATIONS
(REGULAR NJORO CAMPUS)

SECOND SEMESTER 2016/2017

SECOND YEAR RESIT/SPECIAL EXAMINATION FOR THE DEGREE IN COMPUTER SCIENCE

COMP223: OBJECT ORIENTED PROGRAMMING

STREAM: BSC COMPUTER SCIENCE **TIME:** 2 HOURS

EXAMINATION SESSION: SEPT: **YEAR:** 2017

INSTRUCTIONS
1. **Question 1 is compulsory**
2. **Answer any other two questions.**
3. **Extra answered questions will not be marked.**

Question 1 (30 marks) Compulsory

a) Explain the three general types of computer programming languages **(6 marks)**

b) Briefly explain each of the following terms as used in Object Oriented Programming:

i) Object
ii) Class
iii) Inheritance
iv) Interface
v) Package **(@ 2 marks)**

c) Write a program that takes two integers on the command line and prints their sum. For Example: Assuming the executable file is 'Foo', >java Foo 26 24 prints 50 **(4 marks)**

d) In Java, method parameters are passed by value. Explain what this means and give examples of the consequences. **(2 marks)**

e) Write a class called Product. A Product-object should represent a product stocked in a supermarket, e.g. a 100 gram can of Kiwi polish. It should contain the following information: a code for the product, the name of the product, the cost of the product, and the quantity of the product currently in stock. Assume the code and the names are represented by strings of characters. Include the following constructor and methods in the class definition.

i) A constructor Product(code,name) which creates a new product with the given code and name. Initially, the cost and the quantity of the product should be set to zero.

(2 marks)

ii) An instance method getName() that will return the name of the product.

(2 marks)

iii) An instance method addStock(int n) that will add n to the quantity of the product in stock.

(2 marks)

iv) An instance method outOfStock() that will return the value true if there is none of this product in stock. Otherwise it will return false.

(2 marks)

It should not be possible to access the attributes of a Product object except by using the methods listed above

Question 2 (20 marks)

a) Explain the following terms with respect to programming

i) Algorithm

(2 marks)

ii) Pseudo Code

(2 marks)

iii) Source code

(2 marks)

b) A simple program for calculating the total and the mean integer values and which is terminated by a value 0. You are require to

i) write an algorithm for the program

(3 marks)

ii) write a pseudo code for the program

(5 marks)

iii) write a working source for program.

(6 marks)

Question 3 (20 marks)

Use the Skier Class to answer the questions that follows:

```
public class Skier {
        private static final int MAXIMUM_POINTS = 999;
        private String name;
        private static int slalomPoints;
        private int giantSlalomPoints;
        private int superGPoints;
        private String ussaNumber;

        public Skier() {
        }
        public String getBestEvent() {
                if (slalomPoints < giantSlalomPoints) {
                        if (slalomPoints < superGPoints) {
                                return "Slalom";
                        }
                        return "Super G";
                }
                if (giantSlalomPoints < superGPoints) {
                        return "Giant Slalom";
                }
                return "Super G";
        }
}
```

a) What are the names of the instance variables declared in this class? **(4 marks)**

b) What are the signatures of the constructors declared in this class? **(3 marks)**

c) What are the names of the parameters declared in this class? **(3 marks)**

d) What are the signatures of the methods declared in this class? **(3 marks)**

e) What are the names of the constants declared in this class? **(2 marks)**

f) Rewrite the Skier class to be an immutable class. **(5 marks)**

Question 4 (20 marks)

a) Write a single program that prompts for five quiz grades for each five students. The program should then

i) compute the total score and average for each student