KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF THE

DEGREE OF BACHELOR OF SCIENCE IN SOFTWARE ENGINEERING

FIRST SEMESTER, 2023/2024
(AUGUST-DECEMBER, 2023)

SOEN 305: OBJECT ORIENTED PROGRAMMING II [JAVA]

STREAM: Y3 S1 **TIME: 2 HOURS**

DAY: TUESDAY, 03.00–02:00 PM **DATE: 21/11/2023**

INSTRUCTIONS

1. ***Do not write anything on this question paper.***
2. ***Answer Question ONE [Compulsory] and any other TWO Questions.***

QUESTION ONE (30 MARKS)

(a) In your words, describe object oriented programming (2 marks)

(b) What are abstract methods? Describe the circumstances in which an abstract method would be appropriate (2 marks)

(c)

i. Create a class called invoice that a hardware store might use to represent an invoice for an item sold at the store. An invoice should include 4 pieces of information as instance variables; a part number (type string), a part description (type string), a quantity of the item being purchased (type int) and a price per item(double). (5 marks)

ii. . Your class should have a constructor that initializes the 4 instance variables. Provide a set and a get method for each of the 4 instance variables. In addition provide a method named getInvoiceAmount that calculates the invoice amount i.e. multiplies the quantity by the price per item, then returns the amount as a double value. If the quantity is not positive, it should be set to 0.0. (5 marks)

iii. Write a test application named invoiceTest that demonstrates class invoice's capabilities. (5 marks)

(d) Explain how:

i. The super reference is important to a child class. (2 marks)

ii. Inheritance support polymorphism (2 marks)

(e) Describe the principles of the object oriented paradigm (7 marks)

QUESTION TWO (20 marks)

(a) As a software developer, discuss briefly the various error and exception handling options available in Java.

(6 marks)

(b) Write a complete java/C++ program that prompt the user to enter two non-negative integer number. Your program should handle bad input data through the use of a try/catch block to handle the inputMismathException

(8 marks)

(c) Explain the difference between implementing an interface and a derived class. Give code illustrations.

(6 marks)

```
public class SurveyTaker {
        private int numOfYes;
        private int numOfNo;
    public SurveyTaker() {
            this.numOfYes = 0;
            this.numOfNo = 0;
    }
public void enterResponse(String response) {
      if (response.equals("yes")) {
          this.numOfYes++;
    } else if (response.equals("no")) {
          this.numOfNo++;
} }
        public int getYesses() {
        return this.numOfYes;
                }
                }
```

QUESTION THREE (20 marks)

(a) Consider a SurveyTaker class, which can be used to collect data from a yes/no survey.

i. In the class definition, clearly identify one of each of the following components: field, constructor, method, parameter (4 marks)

ii. What would happen if the user called the enterResponse method with an input value other than "yes" or "no"? For example, suppose the user entered "maybe" in the input box when prompted. Would an error occur? If not, what would the method do? Explain your answer.

(5 marks)

iii. Discuss the context of use of this keyword in this code. (3 marks)

iv. Write an application to test the capability of the SurveyTaker class. (8 marks)

(b) Discuss the concept of method overloading and method overriding as used in object oriented programming. Write simple java codes that illustrates the concepts. (8 marks)

QUESTION FOUR (20 marks)

(a) Write a program to generate the Graphical User Interface(GUI)with two buttons labelled IN and OUT. If the user clicks the IN button, the message "DOCTOR IS IN" flashes and if the user click OUT button the message "DOCTOR IS OUT" flashes. (8 marks)

(b) Bu use of examples, discuss the concept of method overloading and method overriding as used in object oriented programming. (8 marks)

(c) Explain the advantage for programming your GUI in an applet environment vs SWING (4 marks)

QUESTION FIVE (20 MARKS)

(a) Write a java program to create a class 'STUDENT' with data members Rgno, Name, Course, Branch, and Semester. Store them in an array of objects. (5 marks)

(b) Write an applet that will display the resulting GUI below. (15 marks)