INTI International College Penang

**FINAL**
Examination Paper

(COVER PAGE)

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| Session | : | **August 2019** |
| Programme | : | Diploma in Electrical and Electronic Engineering (DEEI) |
| Course | : | **CSC2181: Object-Oriented Programming in Java** |
| Date of Examination | : | 10 December 2019 (Tuesday) |
| Time | : | 11:00am – 1:00pm |
| Duration | : | 2 hours Reading Time : Nil |
| Special Instructions | : | |

This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet.

**IMPORTANT NOTE** : **THIS PAPER SHOULD NOT BE TAKEN OUT OF THE EXAMINATION HALL**

Materials Permitted :
Non-Programmable Scientific Calculator

Materials Provided :
Nil

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| Examiner(s) | : | **Ms. Norashida binti Sabari** |
| Moderator | : | Dr. Vincent Khoo |

*This paper consists of 7 printed pages, including the cover page.*

INTI INTERNATIONAL COLLEGE PENANG

DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING (DEEI)
CSC 2181: OBJECT-ORIENTED PROGRAMMING IN JAVA
FINAL EXAMINATIONS: AUGUST 2019 SESSION

**Instructions:** This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

**Question 1**

(a) List **FIVE (5)** common examples of exceptions.

(5 marks)

(b) Suppose x, y, and z are int variables and x = 2, y = 5, and z = 6. Trace and identify the output for each of the following statements:

i. System.out.println("x = " + x + ", y = " + y + ", z = "+ z);

(2 marks)

ii. System.out.println("x + y = " + (x + y));

(2 marks)

iii. System.out.println("Sum of " + x + " and " + z + " is " + (x + z));

(2 marks)

iv. System.out.println("z / x = " + (z / x));

(2 marks)

v. System.out.println("2 times " + x + " = " + (2 * x));

(2 marks)

(c) Body Mass Index (BMI) is a measure of health on weight. It can be calculated by taking your weight in kilograms and dividing by the square of your height in meters. Write a program that prompts the user to enter a weight in pounds and height in inches and displays the BMI. Note that one pound is 0.45359273 kilograms and one inch is 0.0254 meters.

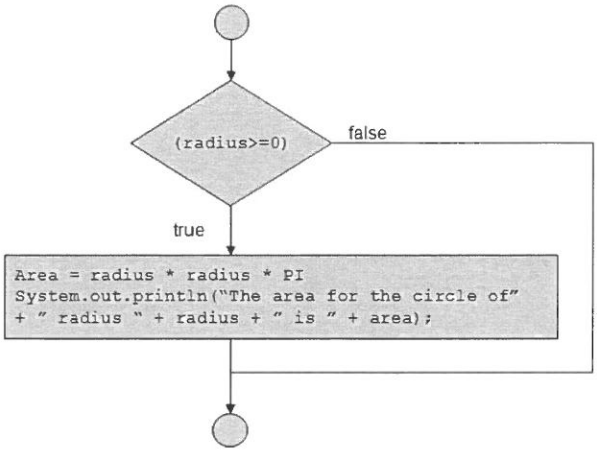
(10 marks)

**Question 2**

(a) List **FOUR (4)** different Java statements that each add 1 to integer variable x.

(4 marks)

(b) Given a flowchart below, translate it into Java code.




(6 marks)

(c) Some websites impose certain rules for passwords. Write a method that checks whether a string is a valid password. Suppose the password rules are as follows:

- A password must have at least eight characters.
- A password contains only letters and digits.
- A password must contain at least two digits.

Write a program that prompts the user to enter a password and displays "Valid Password" if the rules are followed or Invalid Password otherwise.

(15 marks)

**Question 3**

(a) A shipping company uses the following function to calculate the cost (in dollars) of shipping based on the weight of the package (in pounds).

$$c(w) = \begin{cases} 3.5, \text{if } 0 < w <= 1 \\ 5.5, \text{if } 1 < w <= 3 \\ 8.5, \text{if } 3 < w <= 10 \\ 10.5, \text{if } 10 < w <= 20 \end{cases}$$

Write a program that prompts the user to enter the weight of the package and display the shipping cost. If the weight is greater than 50, display a message "The package cannot be shipped."

(10 marks)

(b) Write a program that prompts the user to enter a letter and check whether the letter is a vowel or consonant.

(10 marks)

(c) An access specifier is a Java keyword that indicates how a field or method can be accessed. Differentiate between public and private access specifiers.

(5 marks)

**Question 4**

(a) Consider the following statements:

String str = "Going to the amusement park.";

Analyze and trace the results of the following expressions:

i. System.out.println(str.substring(0, 5));
ii. System.out.println(str.substring(13, 2));
iii. System.out.println(str.toUpperCase());
iv. System.out.println(str.toLowerCasw());
v. System.out.println(str.replace('t', '*');

(5 marks)

(b) Suppose that you have the following class definition:

```
public class One
{
    private int x;
    private int y;

    public void print()
    {
        System.out.println(x + " " + y);
    }
    protected void setData(int u, int v)
    {
        x = u;
        y = v;
    }
}
```

Consider the following class definition:

```
public class Two extends One
{
    private int z;

    public void setData(int a, int b, int c)
    {
        //Postcondition: x = a; y = b; z = c;
    }

    public void print()
    {
        //Output the values of x, y, and z
    }
}
```

i. Write the definition of the method *setData* of the class Two as described in the class definition.

(3 marks)

ii. Write the definition of the method *print* of the class Two as described in the class definition.

(3 marks)

(c) The String class provides methods to return modified String objects. Explain the function of String methods below:

i. concat
ii. replace
iii. trim
iv. startsWith
v. indexOf

(10 marks)

(d) Explain the difference between overloading a method name and overriding a method name.

(4 marks)

**Question 5**

(a) Given the following program segment:

```
int number;
for (number = 1; number <= 10; number ++)
    System.out. print(number + " ");
System.out.println();
```

Write a while and a do…while loop that have the same output.

(6 marks)

(b) Write a method with the following header to display three numbers in increasing order:

public static void displaySortedNumbers(double num1, double num2, double num3)

Write a test program that prompts the user to enter three numbers and invokes the methods to display them in increasing order.

(14 marks)

(c) Analyze and trace the output of the following code:

```
public class MysteryClass
{
    public static void main(String[] args)
    {
        int n;
        for (n = 1; n <= 5; n++)
            System.out.println(mystery(n));
    }
    public static int mystery(int k)
    {
        int x, y;

        y = k;

        for (x = 1; x <= (k - 1); x++)
            y = y * (k - x);

        return y;
    }
}
```

(5 marks)

## Question 6

(a) Consider the following program segment:

```
//import classes
public class Exercise {

    public static void main(String[] args)
    {
        //variable declarations
        //executable statements
    }

}
```

i. Write a Java statement that imports the class Scanner.

ii. Write a Java statement that declares console to be a Scanner object for inputting data from the standard input device.

iii. Write Java statements that declare and initialize the following named constants: SECRET of type int initialized to 11; RATE of type double initialized to 12.50.

iv. Write Java statements that declare the following variables: num1, num2, and newNum of type int; name of type String; hoursWorked and wages of type double.

v. Write Java statements that prompt the user to input two integers and store the first number into num1 and the second number into num2.

vi. Write a Java statement(s) that outputs the value of num1 and num2, indicating which is num1 and which is num2. For example, if num1 is 8 and num2 is 5, then the output is: The value of num1 = 8 and the value of num2 = 5.

vii. Write a Java statement that multiplies that value of num1 by 2, adds the value of num2 to it, and then stores the result in newNum. Then write a Java statement that outputs the value of newNum.

viii. Write a Java statement that updates the value of newNum by adding the value of the named constant SECRET. Then, write a Java statement that outputs the value of newNum with an appropriate message.

ix. Write Java statements that prompt the user to enter a person's last name and then store the last name into the variable name.

x. Write Java statements that prompt the user to enter a decimal number between 0 and 70 and then store the number entered into hoursWorked.

xi. Write a Java statement that multiplies that value of the named constant RATE with the value of hoursWorked and stores the result into the variable wages.

xii. Write Java statements that produce the following output:

```
Name: //output the value of the variable name
Pay Rate: $ //output the value of the named constant RATE
Hours Worked: //output the value of the variable hoursWorked
Salary: $ //output the value of the variable wages
```

For example, if the value of name is "Rainbow" and hoursWorked is 45.50, then the output is:

```
Name: Rainbow
Pay Rate: $12.50
Hours Worked: 45.50
Salary: $568.75
```

(25 marks)

**~ The End ~**