UNIVERSITY OF RUHUNA

BACHELOR OF COMPUTER SCIENCE (BCS) (GENERAL) DEGREE

LEVEL II (SEMESTER I) EXAMINATION – June/July 2015

**COURSE UNIT: CSC 2123 - Object Oriented Programming** **Duration :2 Hours**

*Answer **all four (04)** questions.*

1.

a. Consider the following code segment and answer the question below.

```
public class MyOuter {
        public static class MyInner {
                public static void foo() { }
        }
}
```

Which of the following statements creates an instance of the nested class?

i. MyOuter.MyInner m = new MyOuter.MyInner();
ii. MyOuter.MyInner mi = new MyInner();
MyOuter m = new MyOuter();
iii. MyOuter.MyInner mi = m.newMyOuter.MyInner();
iv. MyInner mi = new MyOuter.MyInner();

b. Which of the following statements is true regarding the following code segment?

```
class A {
        A( ) { }
}

class B extends A { }
```

i. The constructor of class B is public.
ii. The constructor of class B has no arguments.
iii. The constructor of class B includes a call to *this( )*.
iv. None of the above.

c. Briefly explain what is **Garbage Collection** in **Object Oriented Programming** and write the situations where this mechanism is invoked.

d. List five (05) differences between ***an interface*** and ***a class*** in Java programming language.

e. Write the outputs of the Java programs given below. If a code returns a compilation error or a run time error, clearly write the error and the reason for the error.

i.

```
int i = 0;
while(1) {
   if(i == 4) {
      break;
   }
   ++i;
}
System.out.println("i = " + i);
```

ii.

```
int x = 3;
int y = 1;
if (x = y) {
    System.out.println("x =" + x);
}
```

iii.

```
Float f = new Float("12");
switch (f) {
   case 12: System.out.println("Twelve");
   case 0: System.out.println("Zero");
   default: System.out.println("Default");
}
```

iv.

```
public class ArrayTest {
   public static void main(String[ ] args) {
      float f1[ ], f2[ ];
      f1 = new float[10];
      f2 = f1;
      System.out.println("f2[0] = " + f2[0]);
   }
}
```

v.

```
class A {
    final public int GetResult(int a, int b) {
        return 0;
    }
}

class B extends A {
    public int GetResult(int a, int b) {
        return 1;
    }
}

public class Test {
    public static void main(String args[]) {
        B b = new B();
        System.out.println("x = " + b.GetResult(0, 1));
    }
}
```

2.

a.

i. Write a Java method called ***cube*** that accepts an integer parameter and returns its cube value.

ii. Write a Java method called ***absolute*** that accepts an integer parameter and returns its absolute value.

iii. Write a Java method called ***findLargest*** that accepts two integer parameters and returns the largest value of them.

iv. Write a Java method called ***sumOfDigits*** that accepts an integer array and returns the sum of all the values in the array.

b. A bank decides to give 10% annual interest to depositors who are older than 65 years and who have deposits of Rs. 50,000/= or more in their accounts. In order to calculate the interest for each account, a novice programmer in the bank has written a small Java program. He gets several compile time errors in the program. The code written by him is given below. Also, he is not quite sure about the correctness of the logical calculation of the interest.

Identify all the syntax and logic errors in his program given below and write correct Java code segments for each error.

***Hint**: Use the tabular format given below to illustrate your answer.*

```
1.    importjava.util.Scaner;
2.    public class BankInterest;
3.    {
4.      Static double getRate(double age, double deposit) {
5.    double rate;
6.    if (age > 65 || deposit >= 50000)
7.            rate = 5/100;
8.            else
9.            rat = 0;
10.           return rate;
11.     }
12.
13.   static double findInterest (double deposit, double rate) {
14.           interest = deposit + rate;
15.           return rate;
16.     }
17.   public static void main(String[] args)
18.     {
19.      Scanner scan = new Scanner(System.int);
20.           System.out.print ("Enter Age: ");
21.           double a = scan.nextDouble(;
22.           System.out.print ("Enter Deposit: ");
23.           double d = scan.nextDouble();
24.           double r = getRate(a, r);
25            double i = findInterest(d, r);
26.   System.out.println("Interest is: " + i);
27.
28.   } //End of Program
```

**Table 1**

| Line Number | Incorrect Code | Corrected Code |
|---|---|---|
| | | |
| | | |

3.

a. List four (04) key differences between ***class methods*** and ***instance methods***.

b. The following code segment is used when a program works with a database.

```
Statement stmt = con.createStatement();
```

i. What are the uses of ***Statement*** object?

ii. What are the methods used in ***Statement*** interface to execute SQL Statements? Write the purpose and returning values of each method.

c. What is the functionality of Layout Managers?

d. Write a Java program that draws the output given in Figure 1, on top of a *Canvas* according to following specification.

- **Window**: white background, size: 130 x 200 px
- **Overall face circle**: 100 px diameter; top-left corner at (10, 30)
- **Eyes**: Red circles, 20 px diameter; top-left at (30, 60) and (70, 60) for each eye
- **Mouth**: Blue line from (40, 100) to (80, 100)

***Hint:*** *Use methods provided in java.awt.Graphics package*

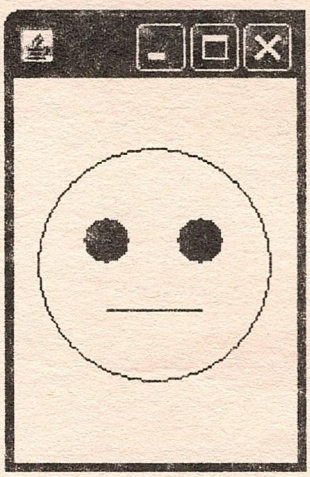

Figure 1

4.

a. Briefly describe the following methods associated with java threads.

   i. join()

   ii. yield()

   iii. notify()

b. Briefly explain the states of a thread using a diagram.

c.

   i. What are the two (02) approaches of synchronizing to access shared data using java?

   ii. Illustrate one of the above approaches with a java program.

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