EASTERN UNIVERSITY, SRILANKA

DEPARTMENT OF MATHEMATICS

SECOND EXAMINATION IN SCIENCE – 2009/2010

FIRST SEMESTER (June. /July., 2011)

OC 206 – Java Programming

Answer all questions   **Time: 2 Hours**

1.

a) Explain the following terms used in Java program:
   i. editor;
   ii. compiler;
   iii. class;
   iv. method.

b) Explain briefly, why Java language is popular.

c) Briefly explain what is meant by the syntax and the semantics of a programming language. Give an example to illustrate the difference between a syntax error and a semantic error

d) List all primitive data types in Java.

e) Show the output of the following program:

```java
public class Numbers {

    public static void main(String[ ] args) {

        int n = 5;
        double num = 2.0;
        double denom = 2.0;
        double pi = 0.0;
        for (int i = 0; i <= n; i++) {

            pi += num/denom;
            num = -2;
            denom += 2;

        }
        pi = pi * 4;
System.out.println("After " + n + " iterations: pi = " + pi);

    }
}
```

2.

a) Find the value of the following Boolean expressions. Which are illegal statements? Assume that in each case, `x=5, y=10, tim=true, fred=false`.

    i.   (x+2)<y

    ii. x||tim

    iii. y<fred

    iv. (x+=5)&&(y==8)

    v. !(fred||x>=5)

b) Write and run a program that uses a `while` loop to compute and print the sum of a given number of squares. For example, if 5 the is input, then the program will print 55, which equals $1^2 +2^2 + 3^2 + 4^2 + 5^2$

c) Write a program to find the factorial values of the first 15 integers.

d) How to declare an array in Java? Write a program to store the following number sets in two dimensional array and to calculate and display the sum of the elements in each row and column.

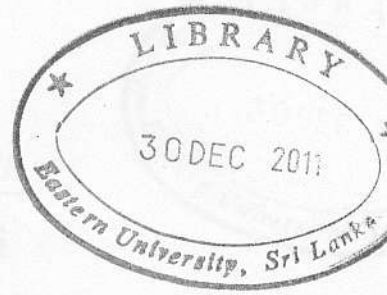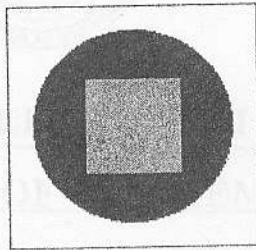$$\{5,7,6,4\}, \{3,5,7,9\}, \{4,9,11,14\}$$

3.

a) Explain the following terms used in Java program:
    i.   accessors;
    ii. mutators;
    iii. constructor.

b) Explain the concept of garbage collection in Java. When is the garbage collector called?

c) Explain the concept of packages in Java. How are they used?

d) Explain the Java terms *super* and *this*.

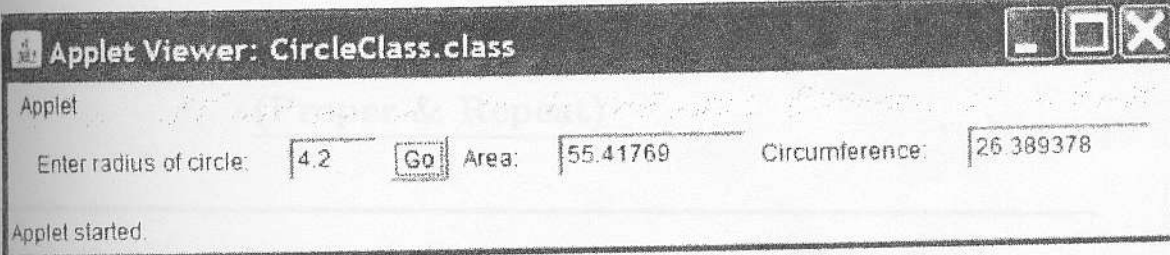e) Write a program to calculate the area of rectangle and triangle abstract classe.

4.

a) List any four sorting algorithms.

b) Draw the picture that will be produced by the following `paint()` method:

```
public static void paint (Graphics g) {
        for (int i=10; i <= 210; i = i + 50)
            for (int j = 10; j <= 210; j = j + 50)
                g.drawLine(i,10,j,60);
    }
```

c) Suppose you would like an applet that displays a green square inside a red circle, as illustrated. Write a `paint()` method that will draw the image.

d) Write the following Java applet and associated HTML file:

Applet Viewer: CircleClass.class

Applet

Enter radius of circle: `4.2` `Go` Area: `55.41769`   Circumference: `26.389378`

Applet started.

Where the user enters a value for the radius of a circle whose corresponding area and circumference values are calculated and displayed automatically when the "Go" button is pressed according to the following formulae:

$$Area = \pi r^2$$
$$Circumference = 2\pi r$$