Self-test: Knowing how much I know about Java

Answer TWO questions.

Full marks will be awarded for complete answers to TWO questions.

There are 50 marks available on this paper

Electronic calculators may be used. The make and model should be specified on the script and the calculator must not be programmed prior to the examination.

Question 1 (a) Consider the following two methods, indicate whether the name clash of x gives a problem. Give your reason. [3]

```
private void methodOne(int x, int y) {
  int z = 0;
  // more code here ..
}

private void methodTwo(int z, int x) {
  int w=1;
  // more code here ..
}
```

(b) Two important techniques in Java programming are *abstraction* and *inheritance*. Explain briefly how these techniques can be used in programming. [4]

(c) Comment briefly on the inefficiency of the following set of statements and provide a better alternative. Suppose there are only four subjects available. [7]

```
if (subject == 'M') System.out.println("Mathematics");
if (subject == 'E') System.out.println("English");
if (subject == 'P') System.out.println("Physics");
if (subject == 'C') System.out.println("Chemistry");
```

(d) Explain under what circumstances the following two segments of codes would have the same effect: [4]

(i)
```
char ch;
for (;;) {
  ch = Text.readChar(in);
  if (ch == 'E') break;
}
```

(ii)
```
char ch;
while (ch != 'E')
  ch=Text.readChar(in);
```

(e) Write a boolean type method which takes (1) an array of integers and (2) the size of the array as parameters and determines if all the integers in the array are between 10 and 50 inclusive. [7]

Question 2 (a) Consider the Java program below. Write what will be displayed on the screen after the execution of the main class C. [5]

```
class A {
  void red () {
    System.out.println("Red");
  }
}

class B extends A {
  void red () {
  System.out.print("Green + ");
  super.red();
  }
}

class C {
  public static void main (String [] args) {
    A a = new A ();
    B b = new B ();
    a.red();
    b.red();
  }
}
```

(b) Using the classes given in the above as an example, explain briefly the meaning of the terms *subclass, superclass,* and *overrides.* [6]

(c) Define an array to store student marks. Suppose each student has only one mark and there are at most one thousand students in total. [2]

(d) Following the above, write a method that displays the marks of the students. [5]

(e) Explain briefly what is an *exception.* Further, describe the *four* essential things that have to be done in a Java program in order to use exceptions. [7]

Question 3 There is some kind of errors in each set of Java statements below. Identify the errors and write the correct version of each set.

(a) To print different messages according to the value of number. [4]

```
if number = 3 System.out.println("full!");
else System.out.println("Try again!");
```

(b) Check if a number is 0, positive or negative. [4]

```
switch (number) {
  case > 0 : System.out.println("Positive");
  case ==0 : System.out.println("Zero");
  case < 0 : System.out.println("Negative");
}
```

(c) Increase by one. [4]

```
class C {
  int getIncreased (int i) {
    A[i] = ++ A[i];
  }
  private int A[] = new int [5];
}
```

(d) Display five "="s in one line on the screen. [4]

```
for (int signs=5; signs<0; signs++) {
  System.out.print('=');
}
System.out.println();
```

(e) Update the whole array of integers. [4]

```
int M [] = new int [100];
for (int i=1; i<=M.length; i++) {
  M[i] = M[i] * 0.3;
}
```

(f) A small Java program. [5]

```
import java.io.*;

Class Hello () {
  public void main (String [] args) throws IOException {
     BufferedReader in = Text.open(System.in);
     Text.prompt("What is your name?");
     String name = Text.readString(in);
     System.out.println("Hello " + name);
  }
}
```