2003 Paper 11 Question 3

Foundations of Programming

(*a*) Using the program below to illustrate your answer, explain the terms *inheritance* and *instantiation*. [6 marks]

(*b*) In what order are the constructors and methods in the following program called? What output would you expect? [14 marks]

```
public class SetUp
 { public static void main(String[] args)
    { Child alf = new Child(11);
      System.out.println("alf.H is " + alf.getH());
    }
 }

class Child extends Parent
 { private int H;

   public Child(int j)
    { super(j);  this.setH();  }

   public void set(int j)
    { super.set(j);  this.setH();  }

   private void setH()
    { this.H = 2*this.getK();
      System.out.println("*** H is now " + H + " ***");  }

   public int getH()
    { return this.H;  }
 }

class Parent
 { private int J, K;

   public Parent(int j)
    { this.set(j);  }

   protected void set(int j)
    { this.J = j;
      System.out.println("*** J is now " + J + " ***");
      this.setK();  }

   private void setK()
    { this.K = 2*J;
      System.out.println("*** K is now " + K + " ***");  }

   public int getK()
    { return this.K;  }
 }
```