This is a closed notes, closed book exam.

1. A good program design is one that has ______________(insert the letters of all that apply). **Answer:** A, D
   A. high cohesion
   B. high coupling
   C. low cohesion
   D. low coupling

2. Java provides both interfaces (e.g. MouseMotionListener) and classes, called adaptors, (e.g. MouseMotionAdapter) for responding to events. Why are both provided? More explicitly, why not provide just the adapter classes (which save typing)?
   **Answer:** You can only extend one adapter, but you can implement multiple interfaces.

3. In response to the “Law of Demeter,” I modified the painting program so that the Pen (previously called PaintListener3) called a method drawOval() in the class Drawing (previously called DrawingCanvas2) instead of calling getGraphics() and getOffscreenImage(). Doing so reduced the ______________(enter the appropriate letter) in the program. **Answer:** B
   A. abstraction
   B. coupling
   C. encapsulation
   D. cohesion

4. VERY briefly describe one technique, preferably the one discussed in class, for identifying some possible candidate classes given a detailed English description of the requirements for a system.
   **Answer:** Underline the nouns and noun phrases.
   There are more questions on the back.
The remaining questions all refer to the following classes.

class ClassOne {
    void print() {
        System.out.println("One");
    }
}
class ClassTwo extends ClassOne {
    void print() {
        System.out.println("Two");
    }
    void special() {
        System.out.println("Two Special");
    }
}
class ClassThree extends ClassOne {
    void print() {
        System.out.println("Three");
    }
    void special() {
        System.out.println("Three Special");
    }
}

5. Which of the classes, ClassOne, ClassTwo, or ClassThree could be used in the blank of the following program without causing ANY program errors at compile time or at runtime? Put your answer in this blank; there could be more than one class, if so, list all that apply.

```java
class Question6 {
    public static void main(String[] args) {
        someMethod(new __________()); // ANS: all three
    }
    static void someMethod(ClassOne param1) {
        param1.print();
    }
}
```

6. Which, if any, of the classes, ClassOne, ClassTwo, or ClassThree, could be used in the blank of the following program without causing a compile time error? Put your answer in this blank; there could be more than one class, if so, list all that apply.

```java
class Question7 {
    public static void main(String[] args) {
        __________ var1; // ANS: ClassOne or ClassTwo
        // some unspecified code here
        someMethod((ClassTwo)var1);
    }
    static void someMethod(ClassTwo param1) {
        param1.special();
    }
}