5 Software and Security Engineering (RJA)

(a) Although the following code compiles and executes without error, give four reasons why it is a poor test.

```java
@Test
public void testIt() {
    long time = System.currentTimeMillis();
    double r = solve(40229321L);
    if (r < 1000.0) {
        assertThat(r == 430.6).isTrue();
    }
    long elapsed = System.currentTimeMillis() - time;
    assertThat(elapsed).isLessThan(3000);
}
```

[8 marks]

(b) You are running a project to develop the next version of an operating system that supports mandatory access control and limits the covert-channel bandwidth that a process at security level High can use to signal down to a process at security level Low.

Discuss the relative contribution of unit testing, integration testing and regression testing in checking that the covert-channel bandwidth is still acceptably low. [8 marks]

(c) The operating system is now going to be used in a different environment so that the load pattern will change. How might this affect covert-channel bandwidth? [4 marks]