**EE 499 – Lab 3**

Question 1)

When the photo resistor’s value is 50 Ω, the voltage that the OpenMote will read will be 2.38 V, which is the maximum voltage value.

When the photo resistor’s value is 100 kΩ, the voltage that the OpenMote will read will be 24.75 mV, which is the minimum voltage value.

Question 2)

Potentiometer 7 bit

* Minimum: -1
* Maximum: 63

Potentiometer 12 bit

* Minimum: -4
* Maximum: 2047

These are the values from the ADC conversion using the OpenMote. As more bits are used, more values can be stored. Therefore, more precision is given to the values of the conversion.

Question 3)

Photo resistor 7 bit

* Minimum: 1
* Maximum: 12

Photo resistor 12 bit

* Minimum: 9
* Maximum: 412

Comparing these values with the ones from the potentiometer, the maximum values are smaller because the voltage that the OpenMote will read is going to be 24.75 mV. Therefore, the maximum value of the photo resistor is 412 in 12 bits, which is 4.9684 smaller than 2047.

Question 4)

When using 7-bit ADC, one bit is used for negative values. Therefore, we have left 6 bits for positive numbers. As a result, the maximum value can be 1+2+4+8+16+32+64 = 127. 2.5/127 = 0.019685 V = 19.685 mV

Question 5)

When using 12-bit ADC, one bit is used for negative values. Therefore, we have left 11 bits for positive numbers. As a result, the maximum value can be 1+2+4+8+16+32+64+128+256+512+1024+2048 = 4095. 2.5/4095 = 0.0006105 V = 0.6105 mV

Question 6)

It takes 20.624 μs to do the conversion with 7-bit ADC. The calculated value in class was 20 μs, which is really close to the value obtained in the laboratory.

Question 7)

It takes 132.62 μs to do the conversion with 12-bit ADC. The calculated value in class was 132 μs, which is really close to the value obtained in the laboratory as well.