ECE 376 - Homework #1

PIC Background. Due Wednesday, January 22nd

Please make the subject "ECE 376 HW#1" if submitting homework electronically to Jacob_Glower@yahoo.com (or on blackboard)

	Answer
1) A PIC processor can drive up to 25mA on its I/O pins. Assuming the output is 5V, what is the smallest R2 can be?	
2) The PIC processor we're using can measure time to 100ns. Assume you're generating the note C3 (220Hz). What's the smallest change in frequency a PIC can generate at 220Hz? (i.e. if you add 100ns to the period)?	
3) The PIC can measure time to 100ns (one clock). How many clocks go by from the time a pitcher throws a 100mph fast ball to the time it crosses the plate 90 feet away?	
4) The A/D on a PIC is a 10-bit A/D (meaning you can read 0..5V with a resolution of one part in 2014 (4.88mV). Suppose you use your PIC to measure resistance using a voltage divider shown below. If R1 is 750 Ohms, what is the resolution of the ohm-meter in Ohms? (hint: the resolution is 4.88mV. Convert this to Ohms)	
5) If R1 is a temperature sensor (in your kit) with $R \approx 1000 \cdot \exp\left(\frac{3903}{T} - \frac{3903}{298}\right)$ What temperature corresponds to 750 Ohms? What is the resolution of this temperature sensor in degrees C?