CLASS 11 HOMEWORK

- *CHAPTER 7*:

  1. **FALSE**.

  2.
     a. Pin 2 would most likely have an external pull up resistor because it is configured as an open drain output.

        We shouldn't allow more than 10 mA current to flow through the PIC32 when PIC32 holds an output low. So, according to Ohm's law we should select a resistor more than **500 Ω (R>500 Ω)**. This is the lower bound of our range. Also, we shouldn't have more than 9V to avoid heating. So, our upper bound on the resistor would be **900 Ω (R<900 Ω).**

     b. AD1PCFG = **0x0000001E**
        TRISB = **0x0000FFF9**
        ODCB = **0x00000004**
        CNPUE = **0x00000040**
        CNCON = **0x00008000**
        CNEN = **0x00000020**

- *CHAPTER 8*:

  1. The time between rollovers is T = (P + 1) * N * 12.5 ns, where P = period match, N = prescaler value.

     T3CON = **0x8060**
     PR3 = **0x4E1F**

- *CHAPTER 9*:

  1. **Maximum f_a = $\frac{80}{2^n}$ KHz**, where n is the bits of resolution.

     We have the constraint, f_c>=10f_a.

     RC filter cutoff frequency, $f_c = \frac{1}{2\pi RC} \Rightarrow$

     So, we get, $\frac{1}{2\pi RC}$ >= 10f_a $\Rightarrow$ RC <= $\frac{1}{2\pi(10f_a)}$ $\Rightarrow$ **RC <= $\frac{2^n}{1600\pi}$**

- CHAPTER 10:

    1. To configure the ADC for manual sampling and automatic conversion, we set bit(s),

       AD1CON1<15> = 1
       AD1CON1<7:5> = 0b111
       AD1CON1<2> = 1

       Tad must be more than 65 ns. So, the next value would be Tad = 75. To set it to this value we set AD1CON3bits.ADCS = 0x02 (value of 2).

    2. Code is attached along with the submission.