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CM _____ Section _____

ME430 - Mechatronics
Examination I – Computer Portion
September 18, 2012

Problem	Score
7	/ 25
8	/ 15
Total	/ 40

For the computer portion of the exam, you may use only:

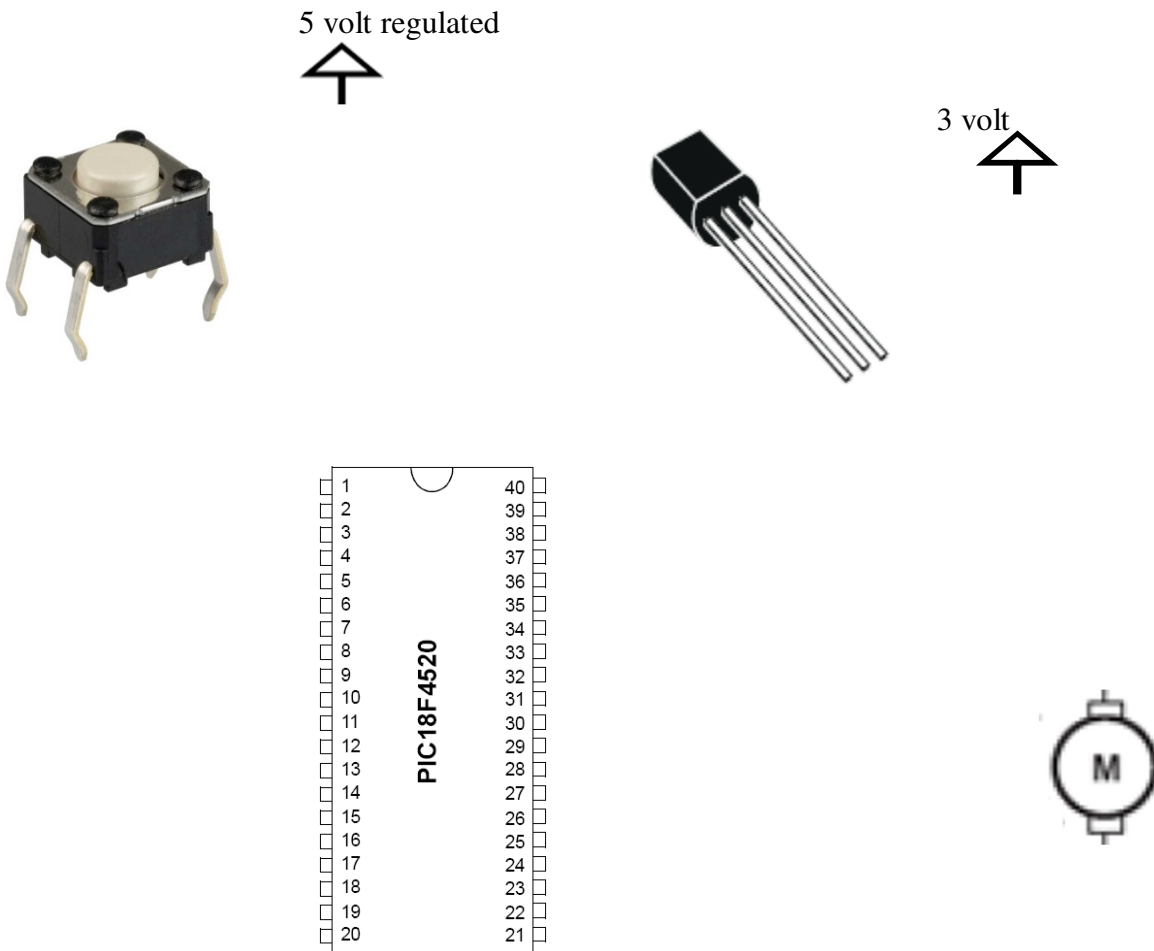
- Your computer
- Any paper notes (such as notes on the videos) you brought to the exam, so long as those notes were written by you or your lab partner.
- Any electronic notes or code residing on your local (C:) hard drive, so long as those notes/code were written by you or your lab partner.
- The course website. (This is the only approved use of the internet for this exam.)
- A calculator (optional).
- ANGEL for code submission.

Anything not specifically allowed is prohibited. In particular, you may not use notes or code written by someone outside your lab group.

Problem 7 – Resistor sizing BJT (NPN):

We wish to create an NPN BJT circuit to drive a pager motor. (On the diagram below, make connections to the physical devices shown, don't redraw a schematic symbols for those items.)

- Draw the power, ground, and enable (MCLR) connections on the PIC.
- Draw a basic switch into pin 2 of the PIC.
- Assume the PIC is using pin 33 to drive the BJT. The pager motor uses a 3 volt source and we have measured its resistance to be 17 ohms. Draw the resistor(s), ground, and wires to the PIC, transistor, power sources, and pager motor shown below.
- Show the calculations to size any resistors that are needed to drive the BJT. Choose standard E12 series (10%) size resistors and label them on the diagram.
- Add inductive kick protection to your circuit as appropriate.



Problem 8 -- Digit Lights Program

Start this program with the template.c file but rename it to **problem8_yourName.c**.

Create a program that displays a light pattern. Use the following pattern that occurs exactly one time.

- Just RB0 & RB3 on
- Delay 0.5 seconds
- Just RB1 & RB2 on
- Delay 1 second
- Just RB0 on
- Delay 2 seconds
- All lights off

Put your finished code (just the *.c file) in the Angel dropbox.