ECET365 Week 1 iLab Cover Sheet

DeVry University

College of Engineering and Information Sciences

**Course Number:** ECET365

**Professor:**

**Laboratory Number: 2**

**Laboratory Title: Motor Control**

**Submittal Date:** Click here to enter a date.

***Objectives***

A. Develop software routines that control Stepper Motors, small permanent magnet DC motors, and Servos.

B. Understand how an H-bridge can be used to control DC motors and Stepper Motors.

***Results***

***Conclusions***

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***Observations/Measurements***

A. Questions for the DC Motor Procedures:

1. What is a use of an Optical Isolator (Optoisolator)?

2. Use Ohmmeter to measure resistance for DC motor used in this Lab.

3. In Activity 1, explain how you turned the DC motor “on” and “off.”

4. In Activity 1, explain how you chose the speed of DC motor.

5. Explain the load and no-load RPM in DC motor.

6. Connect a DC motor leads to +5V and Ground and measure the current usage on current meter. Examine loaded and no-load current usage. Give your conclusion.

7. Explain the PWM technique.

8. What is the disadvantage of using a group of instructions (instead of PWM feature of HCS12) in controlling the speed of the DC motor?

B. Questions for the Stepper Motor Procedures:

1. What is a step angle? Define steps per revolution. What is a step angle for the stepper motor that you used in this Lab? How many steps per revolution do you have for your stepper motor?

2. If a given stepper motor has a step angle of 5 degrees, find the number of steps per

 revolution.

3. Give the four sequences for counter clockwise if it starts with 10011001 (binary).

 4. Using assembly (or C), show a simple program to generate the four‑step sequences if the initial step is 0011 (binary).

 5. Give the number of times the four‑step sequence must be applied to a stepper motor to

 make a 100‑degree move if the motor has a 5‑degree step angle. Also, fill in the

 characteristics for your motor below.

 Step angle \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Degree of movement per 4‑step sequence \_\_\_\_\_\_\_\_

 Steps per revolution \_\_\_\_\_ Number of rotor teeth \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Questions for Servo Procedures:

1. Describe apparent speed of the motor as a function of the pulse width used in PWM control.
2. How did the rotation angle of the servo depend on the pulse width of the input signal?
3. Did you use an H-bridge? Why or why not?
4. Compare the frequencies of pulse trains that you can obtain with a loop program with pulse frequencies from the PWM generator.
5. Compare the pulse trains controlling the servo to the pulse trains controlling the DC motor.