Lab Section: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Lab 6 – Magnetic Levitation:**

**PD and PID Control Design**

*MagLev Plant #:* \_\_\_\_\_\_\_\_\_\_\_\_\_

*Workstation #:* \_\_\_\_\_\_\_\_\_\_\_\_\_

***Prelab:***

**Experiment #2**

*1. Theoretical MagLev plant transfer function:*

*2. Your designed PD controller:*

* *Root locus plot and theoretical closed-loop step response of modelled PD controlled system.*

*(Graph)*

* *Actual step response plot (showing both setpoint and sensor signals) when driven by a square wave (reduce the default amplitude if it is too large). Make comments about transient and steady state behaviors based on your observations. Provide your final controller gains if different from the initial design. Also provide the bias voltage.*

*(Graph)*

**Experiment #3**

*1. Your designed PID controller:*

* *Root locus plot and theoretical closed-loop step response of modelled PID controlled system.*

*(Graph)*

* *Actual step response plot (showing both setpoint and sensor signals) when driven by a square wave (reduce the default amplitude if it is too large). Make comments about transient and steady state behaviors based on your observations. Provide your final controller gains if different from the initial design. Also provide the bias voltage.*

*(Graph)*

*2. Compare PD and PID performances in terms of their pros and cons.*

**Extra Credit: Controller Competition**

*Record your best result*

*Sine wave amplitude @ 1 Hz =*

*Duration (sec) =*

*Controller =*

*(Graph)*