ME 333 Introduction to Mechatronics
Quiz 6

1. Give pseudocode for PID control. You do not have to worry about integrator anti-windup. Your code does not have to copy the notes; it only needs to correctly implement PID control. The beginning of the code is given to you.

```
Eintegrated = 0; eprevious = 0;
Every dt seconds do {
```

   - **Take measurement (1 pt)**
   - **Ref val (1 pt)**
   - **Calculate error (ref-measurement) (2 pts.)**
   - **Calculate derror=(e-eprevious)/dt (2 pts.)**
   - **Calculate eintegrated=eintegrated+error; (2 pts.)**
   - **Calculate u = kp*d+ki*eintegrated+kd*(e-eprevious) (2 pts.)**
   - **Send control (1 pts.)**
   - **Update eprevious = e (1 pt.)**

2. Explain what integrator anti-windup is.
   Sets max/min value for eint to limit the oscillation caused when it is allowed to build up to a large number. (2 pts.)

3. To turn a PID controller into a PD controller, what do you do?

   Set Ki=0; (2 pts.)

4. You have chosen gains KP and Kd for a PD controller
   a. Your overshoot is too large. Which gain do you increase?
      i. **Kd (2 pts.)**
   b. Your steady-state error is too large. Which gain do you increase? (
      i. **Kp (Ki would work if it was a PID controller) (2 pts.)**