PHY 201/181 Lab Instructor notes
Lab 7: Rotational Dynamics
Fall 2003

1. The rotational pendula hang from a rod in the Southwest corner of the room.
2. Currently, the computer program expects four flags on the rotational turntable.
3. The turntable should be set up so that so that the weight falls freely for three complete revolutions of the turntable. The turntable must be at least a couple of inches higher than the surface of the lab table (Also, this allows sufficient room for the pulley and clamp.)
4. There needs to be a more permanent clamp setup for the photogates in the turntable experiment.
5. It seems that friction is a big issue for the rotational turntable. Using the ring sample and a 150 g mass, I got an error of 40%. Larger falling masses produce smaller errors. This needs to be investigated further.
6. The two parts of the experiment can be done in either order.
7. At the beginning of the lab, you will need to lecture a bit on angular motion. This should include:
   (a) I use a table where I list various kinematic quantities $x(t)$, $v(t)$, $a(t)$, et cetera, along with their rotational analogs.
   (b) The definition of torque (I like to use a socket wrench to demonstrate this).
   (c) Angle and omega vs time for constant angular acceleration.
   (d) Moment of inertia formula.
8. The computer program is set up to read from "left" photogate. The plugs are marked "left" and "right".
9. The largest source of error in the torsional pendulum is the problem of samples being off-center.
10. For the turntable, one can stop the turntable after the measurement has been made and before the string unwinds completely.
11. For the turntable, remember that the weight holder itself has mass.
12. At the end of the lab, remove any sample weights from the turntables and place them at the back of the lab.