

Rotational Inertia

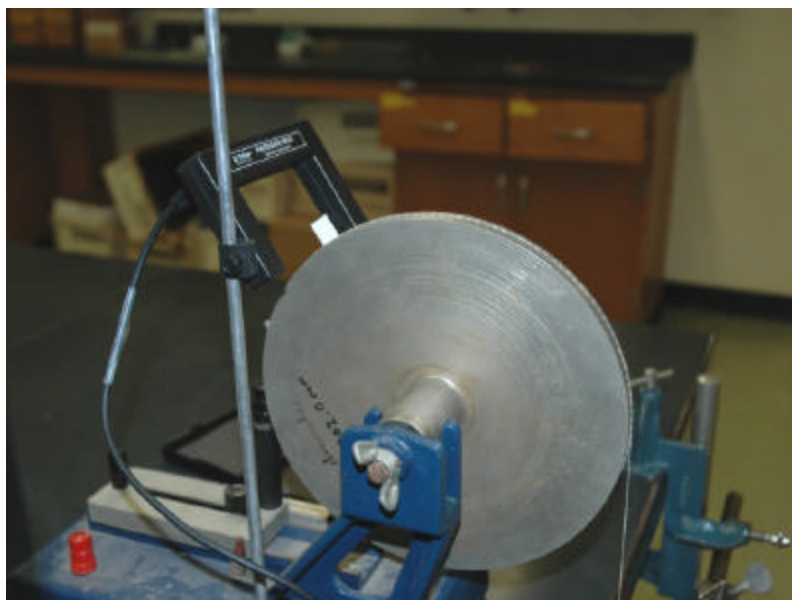
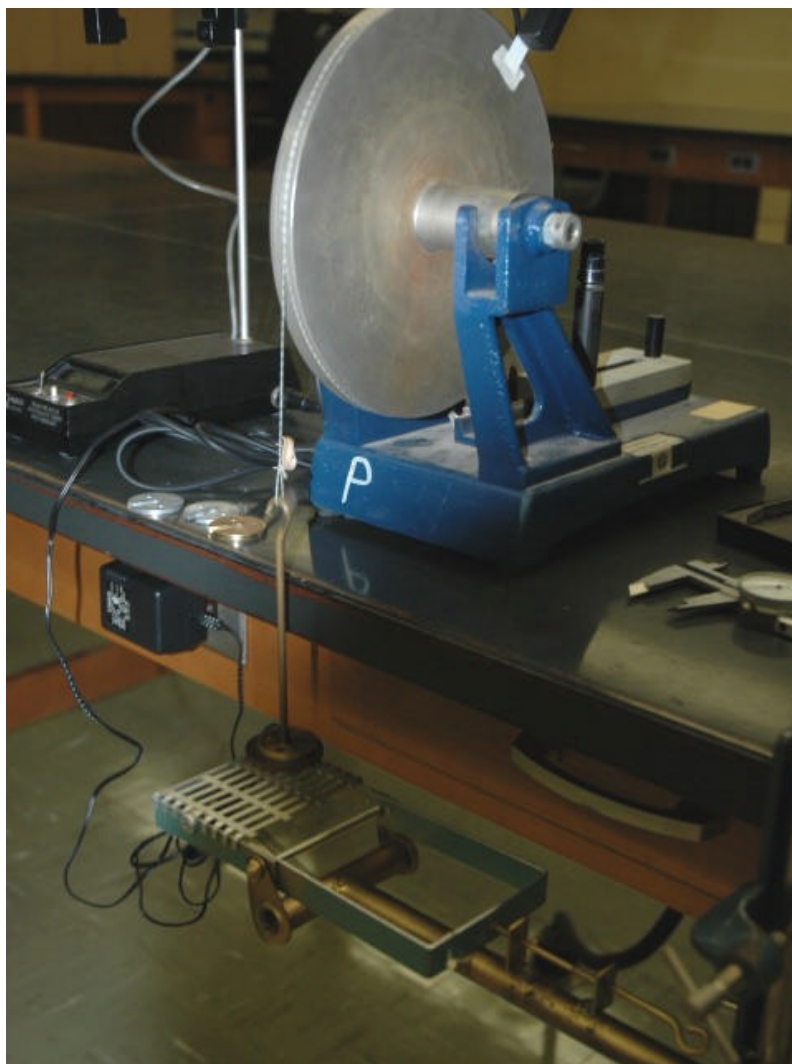
An overall view of the apparatus is shown here. The steel flywheel has a string wrapped around its largest diameter, to which is attached a small weight. When the trapdoor is released, the weight accelerates downward, and the flywheel angularly accelerates.

A single photo-gate timer will measure the time required for the first revolution of the wheel. A light strip of paper affixed to the wheel will trigger the photo-gate both at the start of the rotation, and after one full turn. You'll have to be careful to align the photo-gate to trigger instantly when the trapdoor is released.

Align the trapdoor so that the weight is held near its end, and make sure that the string is taught before you release the trapdoor.

Do not remove the flywheel from its supports for any reason.

You will calculate the moment of inertia of the wheel using two methods. The first method will require you to carefully measure the dimensions of the flywheel. The largest diameter should already be written on the wheel.



The second method uses Newton's Second Law (for rotation), for which you will need to know the time needed to complete one revolution.

In the picture seen here, the rotating flywheel has rotated about one third of a revolution, starting from the point seen in the previous image.

