The picture above shows a rotating disk of mass $M$ and radius $R$. The timer is used to determine the time for one rotation, $T$, used to get the angular velocity $\omega$. The initial angular momentum of the system, $L_i$, is the product of the moment of inertia, $I_i$, and initial angular velocity, $\omega_i$, of the rotating disk. Then a new, non-rotating ring of mass $m$ and radius $r$ is carefully dropped onto the rotating disk. The whole system now rotates with a slower final angular velocity $\omega_f$ because of the new total moment of inertia, $I_f$, is now the sum of the moments of inertia of the disk and ring.

**Fill in the blanks with the appropriate expressions using the elements mentioned above. Show your work.**

Conservation of angular momentum requires

$$L_i = L_f \quad \text{or equivalently} \quad I_i \omega_i = I_f \omega_f$$

Initially we only have the disk rotating, with

$$I_i = I_{disk} = \text{__________________________}, \quad \text{where}$$

$$\omega_i = \text{__________}$$

then we have the disk and the ring with

$$I_f = I_{disk} + I_{ring} = \text{__________________________} \quad \text{and} \quad \omega_f = \text{______________}$$

In this week’s workshop, you will find the moments of inertia and the angular velocities, and check that angular momentum has been conserved, i.e. $I_i \omega_i = I_f \omega_f$