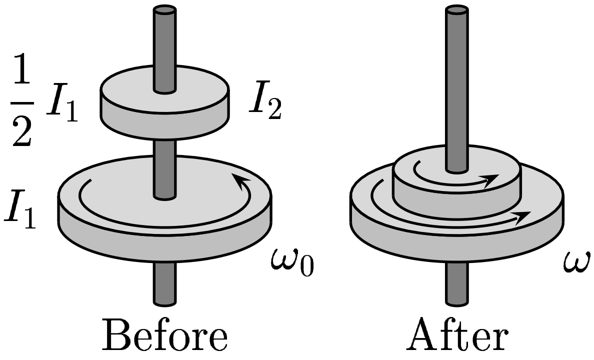

Consider the arrangement shown in the figure. Initially the disk 1 is rotating with an angular velocity ω_0 and disk 2 is at rest.

Then the disk 2 is dropped so that the disks are now rotating together with some reduced angular velocity ω .

$$\textit{Given } I_2 = \frac{I_1}{2} . \quad \textit{Find } \frac{\omega}{\omega_0} .$$

A) $\dfrac{\omega}{\omega_0} = 1 .$

B) $\dfrac{\omega}{\omega_0} = \dfrac{2}{3} .$

C) $\dfrac{\omega}{\omega_0} = \dfrac{1}{2} .$

D) $\dfrac{\omega}{\omega_0} = \dfrac{3}{4} .$

E) $\dfrac{\omega}{\omega_0} = \dfrac{1}{3} .$

The angular momentum is conserved; *i.e.*,

$$L_{before} = L_{after} .$$

This leads to $I_1 \omega_0 = (I_1 + I_2) \omega$, so $\omega = \dfrac{I_1}{I_1 + I_2} \omega_0$.

With $I_2 = \dfrac{I_1}{2}$, so $\dfrac{\omega}{\omega_0} = \dfrac{2}{3}$.

Answer **B**.