



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 .

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

- A) $\frac{\omega}{\omega_0} = 1$.
- B) $\frac{\omega}{\omega_0} = \frac{2}{3}$.
- C) $\frac{\omega}{\omega_0} = \frac{1}{2}$.
- D) $\frac{\omega}{\omega_0} = \frac{3}{4}$.
- E) $\frac{\omega}{\omega_0} = \frac{1}{3}$.

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

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

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

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

Answer **B**.

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