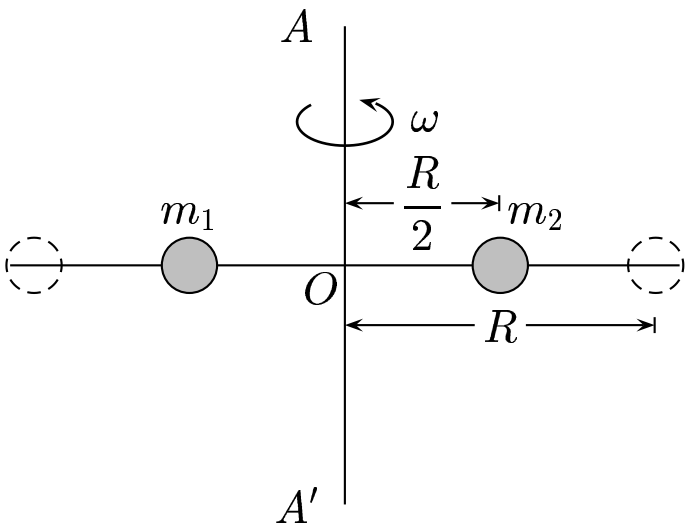

Two masses, m_1 and m_2, are initially at a radius of $\frac{R}{2}$. They are rotating about the axis $A\,A'$ with an angular velocity ω_i.

Then they are released to a radius of R.

Determine their new angular velocity, ω_f, after release. Assume the process is releasing m_1 and m_2 does not lead to a change in the angular momentum.

A) $\omega_f = 4\,\omega_i$.
B) $\omega_f = 2\,\omega_i$.
C) $\omega_f = \frac{\omega_i}{2}$.
D) $\omega_f = \frac{\omega_i}{4}$.

Conservation of angular momentum give, $I_i\,\omega_i = I_f\,\omega_f$, so $\omega_f = \frac{I_i}{I_f}\,\omega_i$.

But "$I = \sum m\,r^2$".

When r is doubled, I is increasing by a factor of 4.

This leads to $\omega_f = \frac{\omega_i}{4}$.

Answer **D**.