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1 • Prelab Questions

1. Angular momentum should be conserved, as momentum is always conserved.
2. Kinetic energy should not be conserved.
3. This is an inelastic collision.

2 • Measurements

Initial Angular Speed (rad/s)	Final Angular Speed (rad/s)	Disk Mass (kg)	Ring Mass (kg)
25.36	3.67	0.12	0.47

Disk Radius (m)	Ring Inner Radius (m)	Ring Outer Radius (m)
$4.8 \cdot 10^{-2}$	$2.75 \cdot 10^{-2}$	$3.8 \cdot 10^{-2}$

3 • Analysis

1. $L_i = L_{idisk} + L_{iring} = I_{disk}\omega_{idisk} + 0\frac{kg \cdot m^2}{s} = 0.0035\frac{kg \cdot m^2}{s}$
2. $L_f = L_{f\,disk} + L_{f\,ring} = I_{disk}\omega_{f\,disk} + I_{ring}\omega_{f\,ring} = 0.0024\frac{kg \cdot m^2}{s}$
3. $KE_i = \frac{1}{2}I_{disk}{\omega_i}^2_{disk} + 0J = 0.044J$
4. $KE_f = \frac{1}{2}I_{disk}{\omega_f}^2_{disk} + \frac{1}{2}I_{ring}{\omega_f}^2_{ring} = 0.0044J$
5. $L_{\%conserved} = \frac{L_f}{L_i} = 67.91\%$
6. $KE_{\%lost} = 100\% - \frac{KE_f}{KE_i} = 90.18\%$
7. $J_{ring} = L_{f\,ring} - L_{iring} = 0.0019\frac{kg \cdot m^2}{s} - 0\frac{kg \cdot m^2}{s} = 0.0019\frac{kg \cdot m^2}{s}$
8. $J_{disk} = L_{f\,disk} - L_{idisk} = 0.00051\frac{kg \cdot m^2}{s} - 0.0035\frac{kg \cdot m^2}{s} = -0.0030\frac{kg \cdot m^2}{s}$
9. The two impulses have similar magnitudes but opposite signs, which makes sense since the total change in momentum, which is the sum of the impulses, should be zero.