

Angular Momentum Problems

1. If the Earth's radius is suddenly cut in half, how long would the day be?
2. A disc is rotating at a rate of $\frac{10\pi}{3}$ rad/sec. An object of mass .005 kg falls onto the disc .02m from the center. If the disc now rotates at a rate of 50 rpm, find the moment of inertia of the disc.
3. How long would the day be if the Earth had 1/27 of its original volume?
4. A horizontal disc is rotating at a rate of 150 rpm. An object with a mass of 15kg falls onto the disc 50cm from the center. If the moment of inertia of the disk is $2 * 10^{-3} \text{ kg} * \text{m}^2$, find the new frequency.
5. A disc is rotating at a rate of 200 rpm. An object with a mass of 3 grams falls onto the disc a distance of 30 cm from the center. If the speed is now 30 rpm, find the moment of inertia of the disc.