

48

Calculate the angular momentum of the Earth about its own axis. (Let Earth be a uniform sphere and 1 rotation take 24 hours.)

$$L = I \omega$$

$$I = \frac{2}{5} m r^2$$

$$\omega = \frac{\Delta \theta}{\Delta t} = \frac{2\pi \text{ rad}}{24 \text{ hrs}} \left( \frac{1 \text{ hr}}{3600 \text{ s}} \right)$$

$$L = \frac{2}{5} (5.97 \times 10^{24} \text{ kg}) (6.37 \times 10^6 \text{ m})^2 \left( \frac{2\pi \text{ rad}}{24(3600 \text{ s})} \right)$$

$$= 7.05 \times 10^{33} \frac{\text{kg m}^2}{\text{s}}$$