$$I = \frac{2}{5}mr^2 = \frac{2}{5}\left(5.98\times10^{24}\,\text{kg}\right)\left(6.37\times10^{6}\,\text{m}\right)^2 = 9.7\times10^{37}\,\text{kg-m}^2,$$

$$K = \frac{1}{2}\left(9.7\times10^{37}\,\text{kg-m}^2\right)\left(\frac{2\pi}{86{,}400.0\,\text{s}}\right)^2 = 2.56\times10^{29}\ \text{J};$$