83. We write $m = \rho\mathcal{V}$ where $\mathcal{V} = 4\pi R^3/3$ is the volume. Plugging this into $F = ma$ and then into Eq. 34-32 (with $A = \pi R^2$, assuming the light is in the form of plane waves), we find

$$\rho \frac{4\pi R^3}{3} a = \frac{I\pi R^2}{c} \ .$$

This simplifies to

$$a = \frac{3I}{4\rho c R}$$

which yields $a = 1.5 \times 10^{-9}$ m/s^2.