34. The translational kinetic energy of the molecule is

$$K_t = \frac{1}{2}mv^2 = \frac{1}{2}\left(5.30 \times 10^{-26}\right)(500)^2 = 6.63 \times 10^{-21}\ \text{J} .$$

With $I = 1.94 \times 10^{-46}$ kg·m^2, we employ Eq. 11-27:

$$\begin{aligned} K_r &= \frac{2}{3}K_t \\ \frac{1}{2}I\omega^2 &= \frac{2}{3}\left(6.63 \times 10^{-21}\right) \end{aligned}$$

which leads to $\omega = 6.75 \times 10^{12}$ rad/s.