64. (a) We use the parallel-axis theorem to find the rotational inertia:

$$\begin{aligned} I &= I_{\text{com}} + Mh^2 = \frac{1}{2}MR^2 + Mh^2 \\ &= \frac{1}{2}(20\,\text{kg})(0.10\,\text{m})^2 + (20\,\text{kg})(0.50\,\text{m})^2 \\ &= 0.15\ \text{kg}\cdot\text{m}^2\ . \end{aligned}$$

(b) Conservation of energy requires that $Mgh = \frac{1}{2}I\omega^2$, where ω is the angular speed of the cylinder as it passes through the lowest position. Therefore,

$$\omega = \sqrt{\frac{2Mgh}{I}} = \sqrt{\frac{2(20)(9.8)(0.050)}{0.15}} = 11\ \text{rad/s}\ .$$