

90. The period formula, Eq. 16-29, requires knowing the distance h from the axis of rotation and the center of mass of the system. We also need the rotational inertia I about the axis of rotation. From Figure 16-53, we see $h = L + R$ where $R = 0.15$ m. Using the parallel-axis theorem, we find

$$I = \frac{1}{2}MR^2 + M(L + R)^2 \quad \text{where } M = 1.0 \text{ kg} .$$

Thus, Eq. 16-29, with $T = 2.0$ s, leads to

$$2.0 = 2\pi \sqrt{\frac{\frac{1}{2}MR^2 + M(L + R)^2}{Mg(L + R)}}$$

which leads to $L = 0.8315$ m.