

22-R-KIN-JL-9

A slender rod has one end at point A as the other end falls freely. If the rod has a length of 15.2 m and a mass of 22.9 g, what is its radius of gyration about point A?

Solution

The mass moment of inertia at the end of a slender rod is:

$$I_A = \frac{1}{3}ml^2$$

The radius of gyration about point A is:

$$k = \sqrt{\frac{I_A}{m}} \implies I_A = mk^2$$

Equating the values for I_A gives:

$$mk^2 = \frac{1}{3}ml^2$$

$$k = \frac{l}{\sqrt{3}} = \frac{15.2}{\sqrt{3}} = 8.776 \quad [\text{m}]$$

