

### Answer on Question #72040-Physics-Other

A solid cube of side-length 10 cm is hanged from one of its vertices by a 1m long thread. If the cube is allowed to oscillate, find its angular frequency. (Assume that, the amplitude of oscillation is small, and,  $g=10\text{m/s}^2$ )

#### Solution

The angular frequency of physical pendulum is

$$\omega = \sqrt{\frac{mgL}{I}}$$

In our case:

$$L = 1 + \frac{0.1}{\sqrt{2}}$$

$$I = \frac{ma^2}{6} + mL^2.$$

$$\omega = \sqrt{\frac{mgL}{\frac{ma^2}{6} + mL^2}} = \sqrt{\frac{gL}{\frac{a^2}{6} + L^2}} = \sqrt{\frac{10 \left(1 + \frac{0.1}{\sqrt{2}}\right)}{\frac{0.1^2}{6} + \left(1 + \frac{0.1}{\sqrt{2}}\right)^2}} = 3 \frac{\text{rad}}{\text{s}}.$$

**Answer:**  $3 \frac{\text{rad}}{\text{s}}$ .