

Answer on Question 64826, Physics, Other

Question:

How long must a simple pendulum be if it is to make exactly one swing per two seconds? (That is, one complete oscillation takes exactly 4.0 s)

Solution:

We can find the length of the simple pendulum from the formula:

$$T = 2\pi \sqrt{\frac{L}{g}},$$

here, $T = 4.0 \text{ s}$ is the period of the pendulum, L is the length of the pendulum, $g = 9.8 \text{ m/s}^2$ is the acceleration due to gravity.

Then, we get:

$$T^2 = 4\pi^2 \frac{L}{g},$$
$$L = \frac{T^2}{4\pi^2} g = \frac{(4.0 \text{ s})^2}{4\pi^2} \cdot 9.8 \frac{\text{m}}{\text{s}^2} = 3.97 \text{ m}.$$

Answer:

$$L = 3.97 \text{ m}.$$

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