Answer on Question #41302 - Physics – Other

Question.

In a simple pendulum experiment to determine inaccessible height, T^{2}/s^{2} was plotted on the vertical axis and h/cm on the horizontal axis. T is the period and h is the height of the pendulum bob from the floor. Which of the following gives the inaccessible height H?

Given: $T^2[s^2]$

Find: $h\ [cm]$

Solution.

The period of simple pendulum is:

$$T = 2\pi\sqrt{\frac{h}{g}}$$

T is a period of the motion, the time for a complete oscillation;

h is the length of the pendulum;

g is the gravitational acceleration.

Therefore,

$$T^2 = 4\pi^2\frac{h}{g} = \frac{4\pi^2}{g}h$$

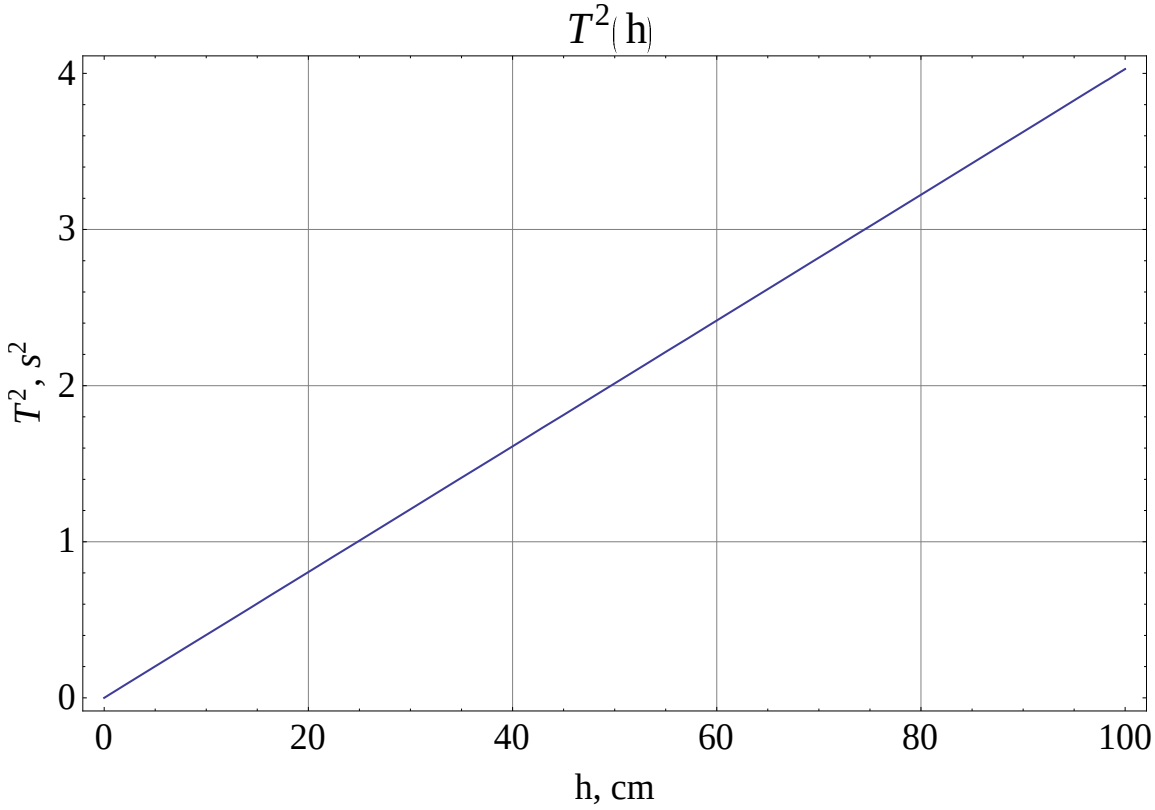
$$h = \frac{g}{4\pi^2}T^2\ [m]$$

or in centimeters:

$$h = \frac{g}{4\pi^2}T^2 \cdot 100 = \frac{25g}{\pi^2}T^2\ [cm]$$

It is a linear dependence T^2 on h.

So, obtain the following graph depending T^2 on h :



Answer.

$h = \frac{25g}{\pi^2} T^2 \ [cm]$