Answer on Question #66778, Physics / Molecular Physics | Thermodynamics

The time period of a simple pendulum ,called 'second pendulum ' is 2 s .Calculate the length ,angular frequency And frequency of the pendulum . What is the different b/w a simple pendulum & a compound pendulum?

Find: T – ? υ – ? ω – ?

Given:

T=2 s

g=9.8 m/s^2

Solution:

Simple pendulum:

$$T = 2\pi\sqrt{\frac{l}{g}} \ (1)$$

Of (1) $\Rightarrow$ $T^2 = 4\pi^2\frac{l}{g}$ (2)

Of (2) $\Rightarrow$ $l = \frac{T^2 g}{4\pi^2}$ (3)

Of (3) $\Rightarrow$ l=1 m

Frequency of the pendulum:

$$\upsilon = \frac{1}{T} \ (4)$$

Of (4) $\Rightarrow$ υ=0.5 s^{-1}

Angular frequency:

$$\omega = 2\pi\upsilon \ (5)$$

Of (5) $\Rightarrow$ ω=3.14 s^{-1}

Answer:

The length: 1 m

Frequency of the pendulum: 0.5 s^{-1}

Angular frequency: 3.14 s^{-1}

What is the different b/w a simple pendulum & a compound pendulum?

Simple pendulum

The simple pendulum consists of a pivot, a string and a mass. For ease of calculations, the string is assumed to be non-elastic and have zero mass, and the air viscosity on the mass is negligible.

The period and, therefore, the frequency of the simple pendulum depends only on the length of the string and the gravitational acceleration.

Compound pendulum

The compound pendulum, which is also known as the physical pendulum, is an extension of the simple pendulum. The physical pendulum is any rigid body that is pivoted so that it can oscillate freely. Mass of the compound pendulum is not zero.

The period and the frequency of the compound pendulum depend on the length of gyration, the moment of inertia, and the mass of the pendulum, as well as the gravitational acceleration.