Question.

A pendulum set up in the stairwell of a tall building consists of a heavy weight suspended on a 34.7 m wire. Using g=9.8 m/s2 find the frequency of oscillation.

    A) 0.3 s
    B) 0.5 s
    C) 0.085 s
    D) 11.82 s

Given:

$L = 34.7\ m$

$g = 9.8\ \dfrac{m}{s^2}$

Find:

$v = ?$

Solution.

By definition the period of a pendulum can be approximated by:

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

And we know that

$$v = \frac{1}{T}$$

So,

$$v = \frac{1}{2\pi} \sqrt{\frac{g}{L}}$$

Calculate:

$$v = \frac{1}{6.28} \sqrt{\frac{9.8}{34.7}} = \frac{1}{6.28} \cdot 0.5314 = 0.0846\ Hz \approx 0.085\ Hz = 0.085\ s^{-1}$$

$$T = \frac{1}{v} = \frac{1}{0.0846} = 11.82\ s$$

Answer.

The frequency of oscillation is:

$$v = \frac{1}{2\pi}\sqrt{\frac{g}{L}} = 0.085 \ s^{-1}$$

   C) 0.085 s

The period of oscillation is:

$$v = 2\pi\sqrt{\frac{L}{g}} = 11.82 \ s$$

   D) 11.82 s