

Answer on Question #47645 – Physics – Other

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 $g=9.8 \text{ m/s}^2$ find the frequency of oscillation.

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

Given:

$$L = 34.7 \text{ m}$$

$$g = 9.8 \frac{\text{m}}{\text{s}^2}$$

Find:

$$\nu = ?$$

Solution.

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

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

And we know that

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

So,

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

Calculate:

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

$$T = \frac{1}{\nu} = \frac{1}{0.0846} = 11.82 \text{ s}$$

Answer.

The frequency of oscillation is:

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

C) 0.085 s

The period of oscillation is:

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

D) 11.82 s