

Answer on Question #47648 – Physics – Mechanics, Kinematics, Dynamics

Question.

A mass of 0.50 kg is hung from a spring with spring constant 15.4 N/m. What is the period of oscillation? What is the frequency of oscillation for the hanging mass?

Given:

$$m = 0.5 \text{ kg}$$

$$k = 15.4 \frac{\text{N}}{\text{m}}$$

Find:

$$T = ? \quad \nu = ?$$

Solution.

By definition the period of a harmonic oscillator can be approximated by:

$$T = 2\pi \sqrt{\frac{m}{k}}$$

And we know that

$$\nu = \frac{1}{T} = \frac{1}{2\pi} \sqrt{\frac{k}{m}}$$

Calculate:

$$T = 2\pi \sqrt{\frac{0.5}{15.4}} = 1.132 \text{ s}$$

$$\nu = \frac{1}{2\pi} \sqrt{\frac{15.4}{0.5}} = 0.883 \text{ Hz}$$

Answer.

$$T = 2\pi \sqrt{\frac{m}{k}} = 1.132 \text{ s}$$

$$\nu = \frac{1}{2\pi} \sqrt{\frac{k}{m}} = 0.883 \text{ Hz}$$