Question.

A mass of 0.50 kg is hung from a spring and has a frequency of oscillation of 0.113 Hz. What is the spring constant?

Given:

$m = 0.5 \; kg$

$v = 0.113 \; \text{Hz}$

Find:

$k = ?$

Solution.

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

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

And we know that

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

Therefore,

$$k = 4\pi^2 v^2 m$$

Calculate:

$$k = 4\pi^2 \cdot 0.113^2 \cdot 0.5 = 0.252 \; \frac{N}{m}$$

Answer.

$k = 4\pi^2 v^2 m = 0.252 \; \dfrac{N}{m}$