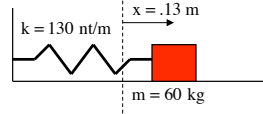


### Problem 13.1

When a 60 kg mass is attached to a spring with a spring constant of 130 nt/m. It is elongated a distance .13 meters from its equilibrium position.



- What is the force on the mass in this position?
- What is the acceleration of the mass at this point?
- The mass is released. What is the amplitude of the periodic motion?
- What is the frequency of the motion?

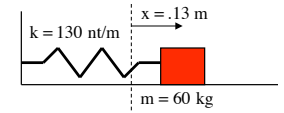
1.)

- The mass is released. What is the amplitude of the periodic motion?

The amplitude is defined as the maximum displacement of the mass as it oscillates back and forth. In this case, it starts at its maximum displacement, so the answer is .13 meters.

- What is the frequency of the motion?

Ah, that's the question!



3.)

- What is the force on the mass in this position?

$$\begin{aligned} F_{\text{spring}} &= -kx \\ &= -(130 \text{ nt/m})(.13 \text{ m}) \\ &= -16.9 \text{ nt} \end{aligned}$$

- What is the acceleration of the mass at this point?

$$\begin{aligned} F_{\text{spring}} &= ma \\ \Rightarrow (16.9 \text{ nt}) &= (60 \text{ kg})a \\ \Rightarrow a &= .28 \text{ m/s}^2 \end{aligned}$$

2.)