

AP Physics 1

Oscillation Problem Answers

1.) $T = 0.354 \text{ s}$

2.) $k = 40.9 \frac{\text{N}}{\text{m}}$

3.) a.) $v = 2.83 \frac{\text{m}}{\text{s}}$

b.) $E = 2.00 \text{ J}$

c.) $x = (0.15 \text{ m})\cos\left(18.85 \frac{\text{rad}}{\text{s}}t\right)$
 $v = -\left(2.83 \frac{\text{m}}{\text{s}}\right)\sin\left(18.85 \frac{\text{rad}}{\text{s}}t\right)$
 $a = -\left(53.3 \frac{\text{m}}{\text{s}^2}\right)\cos\left(18.85 \frac{\text{rad}}{\text{s}}t\right)$

4.) a.) $k = 126 \frac{\text{N}}{\text{m}}$

b.) $A = 0.178 \text{ m}$

5.) $m = 0.0310 \text{ kg}$

6.) 105 oscillations

7.) a.) $T = 0.524 \text{ s}$

b.) $k = 36.0 \frac{\text{N}}{\text{m}}$

c.) $E = 1.04 \text{ J}$

d.) $v_{\text{max}} = 2.88 \frac{\text{m}}{\text{s}}$

8.) a.) $v = 2.83 \frac{\text{m}}{\text{s}}$

b.) $A = 0.447 \text{ m}$

9.) a.) $\ell = 0.248 \text{ m}$ (on Earth)
 $\ell = 0.0937 \text{ m}$ (on Mars)

b.) $m = 0.253 \text{ kg}$ (on both Earth and Mars)

10.) $T = 3.17 \text{ s}$

11.) $g = 2.37 \frac{\text{m}}{\text{s}^2}$