

(12) $k = 1400 \text{ N/m}$
 $x = .075 \text{ m}$
 $m = .024 \text{ kg}$

$$\frac{1}{2}mv^2 = \frac{1}{2}kx^2$$

$$(v = 18.1 \text{ m/s})$$

(16) $l = 9.8 \text{ m}$ $T = 2\pi\sqrt{\frac{l}{g}}$

$$T = 6.2 \text{ s}$$

$$f = \frac{1}{T} = 1.16 \text{ Hz}$$

(17) $k = 180 \text{ N/m}$
 $M = 1.5 \text{ kg}$

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

$$(T = 1.57 \text{ s})$$

$$f = \frac{1}{T} = 1.8 \text{ Hz}$$

18. $T = 9.49 \text{ s}$

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

$$l = 22.4 \text{ m}$$

(19) $g = 1.6 \text{ m/s}^2$
 $T = 2.0 \text{ s}$

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

$$(l = 1.16 \text{ m})$$

(20) $m = .75$
 $x = .30 \text{ m}$

a) $k = \frac{F}{x} = 25 \text{ N/m}$

b) $T = 2\pi\sqrt{\frac{m}{k}}$
 $(T = 1.1 \text{ s})$

(21) $l = 2.5 \text{ m}$

a) $T = 2\pi\sqrt{\frac{l}{g}}$

$$T = 3.2 \text{ s}$$

b) $f = \frac{1}{T} = 1.31 \text{ Hz}$

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(16) $d = 2 \times 465 \text{ m}$
 $= 930 \text{ m}$

$$t = 2.75 \text{ s}$$

a) $v = \frac{d}{t} = \frac{930}{2.75} = 338 \text{ m/s}$

b) $v = f\lambda$ $f = \frac{v}{\lambda} = \frac{338}{.750}$

$$(f = 451 \text{ Hz})$$

c) $T = \frac{1}{f} = \frac{1}{451} = 2.22 \times 10^{-3} \text{ s}$

(20) $f = \frac{5040 \text{ Hz}}{.100 \text{ s}} = 50.0 \text{ Hz}$

$$\lambda = .0120$$

$$v = f\lambda$$

$$= (50.0)(.0120)$$

$$= .600 \text{ m/s}$$