16-76

(a) In a room on Earth, $g = 9.8 \text{ m/s}^2$

$$T = 2\pi \sqrt{\frac{l}{g}} = 2\pi \sqrt{\frac{2.0}{11.8 \times 10^{-2}}} = 2.84 \text{ s}$$

(b) For upward acceleration, elevation $g_{eff}=9.8 \text{ m/s}^2 + 2 \text{ m/s}^2$

$$T = 2\pi \sqrt{\frac{l}{g_{eff}}} = 2\pi \sqrt{\frac{2.0}{11.8 \times 10^{-2}}} = 2.59 \text{ s}$$

(c) In free fall $g_{eff}=0$, so $T$ is infinite! That is, the pendulum doesn't swing.

14-79

One length is

Amplitude

Corresponding

Lining of

Diagram

Restoring force but from STHM equation

$$v = -\omega \sin(\omega t + \phi)$$

We know that $A \omega \omega = \omega^2 A \omega = (l \omega_{max})^2$

So $\omega$ becomes

$$T = mg = \frac{ml^2 \omega_{max}^2}{2}$$

$$T = mg \left(1 + \omega_{max}^2\right)$$