

$$\begin{aligned}
 5. \quad F_{\text{net}} &= ma \\
 &= (6.2 \text{ kg})(1.1 \text{ m/s}^2) \\
 &= 6.8 \text{ N}
 \end{aligned}$$

$$F_{\text{net}} = T - F_f$$

$$\begin{aligned}
 F_f &= T - F_{\text{net}} \\
 &= 22.0 \text{ N} - 6.8 \text{ N} \\
 &= 15.2 \text{ N}
 \end{aligned}$$

$$\begin{aligned}
 F_f &= \mu F_N \\
 \text{or } F_f &= \mu mg
 \end{aligned}$$

$$\begin{aligned}
 \mu &= \frac{F_f}{mg} \\
 &= \frac{15.2 \text{ N}}{(6.2 \text{ kg})(9.80 \text{ m/s}^2)} \\
 &= 0.25
 \end{aligned}$$

Lesson 6—Hooke's Law

$$\begin{aligned}
 1. \quad F &= -kx \\
 &= -(20.0 \text{ N/m})(0.100 \text{ m}) \\
 &= -2.00 \text{ N}
 \end{aligned}$$

$$\begin{aligned}
 2. \quad F &= -kx \\
 x &= \frac{-F}{k} \\
 &= \frac{-2.0 \text{ N}}{15 \text{ N/m}} \\
 &= 0.13 \text{ m}
 \end{aligned}$$

$$\begin{aligned}
 3. \quad F &= -kx \\
 k &= \frac{F}{x} \\
 &= \frac{1.2 \text{ N}}{0.025 \text{ m}} \\
 &= 48 \text{ N/m}
 \end{aligned}$$

$$\begin{aligned}
 4. \quad F &= -kx \\
 k &= \frac{F}{x} \\
 &= \frac{1.65 \text{ N}}{0.110 \text{ m}} \\
 &= 15.0 \text{ N/m}
 \end{aligned}$$

$$\begin{aligned}
 5. \quad F_g &= mg \\
 &= (5.0 \text{ kg})(9.80 \text{ m/s}^2) \\
 &= 49 \text{ N}
 \end{aligned}$$

$$F = -kx$$

$$\begin{aligned}
 k &= \frac{F}{x} \\
 &= \frac{49 \text{ N}}{3.25 \times 10^{-2} \text{ m}} \\
 &= 1.5 \times 10^3 \text{ N/m}
 \end{aligned}$$

$$\begin{aligned}
 6. \quad F &= -kx \\
 x &= \frac{-F}{k} \\
 &= \frac{-9.3 \text{ N}}{25 \text{ N/m}} \\
 &= 0.37 \text{ m}
 \end{aligned}$$

$$\begin{aligned}
 7. \quad \text{max. } F_{\text{net}} &= \text{max } F_s = k \text{ max } x \\
 &= (5.0 \text{ N/m})(0.080 \text{ m}) \\
 &= 0.40 \text{ N} \\
 \text{max acceleration} &= \frac{\text{max } F_{\text{net}}}{m} \\
 &= \frac{0.40 \text{ N}}{75 \times 10^{-3} \text{ kg}} \\
 &= 5.3 \text{ m/s}^2
 \end{aligned}$$

Lesson 7—Momentum

$$\begin{aligned}
 1. \quad p &= mv \\
 &= (4.0 \text{ kg})(12.0 \text{ m/s}) \\
 &= 48 \text{ kg}\cdot\text{m/s east}
 \end{aligned}$$

$$\begin{aligned}
 2. \quad p &= mv \\
 v &= \frac{p}{m} \\
 &= \frac{25.0 \text{ kg}\cdot\text{m/s}}{5.0 \text{ kg}} \\
 &= 5.0 \text{ m/s west}
 \end{aligned}$$

$$\begin{aligned}
 3. \quad p &= mv \\
 m &= \frac{p}{v} \\
 &= \frac{36.0 \text{ kg}\cdot\text{m/s}}{8.0 \text{ kg}} \\
 &= 4.5 \text{ kg}
 \end{aligned}$$