p208

38. $\vec{v} = 28\,m/s\,[W]$

$\vec{p} = 4.2 \times 10^4\,kg \cdot m/s\,[W]$

$m = ?$

$\vec{p} = m\vec{v}$

$m = \dfrac{\vec{p}}{\vec{v}}$

$m = \dfrac{4.2 \times 10^4\,kg \cdot m/s\,[W]}{28\,m/s\,[W]}$

$m = 1.5 \times 10^3\,kg$

p210

40. $V_1 = 0$

$V_2 = 100\,km/h \left(\frac{1000}{3600}\right) = 27.78\,m/s$

$\Delta t = 6.0\,s$

$m = 1.5 \times 10^3\,kg$

$\vec{F} = ?$

$\vec{J} = \Delta\vec{p}$

$\vec{F}\Delta t = m\Delta\vec{V}$

$\vec{F} = \dfrac{m\Delta\vec{V}}{\Delta t}$

$\vec{F} = \dfrac{m(\vec{V}_2 - \vec{V}_1)}{\Delta t}$

$\vec{F} = \dfrac{1.5 \times 10^3\,kg\,(27.8\,m/s - 0)}{6.0\,s}$ [forward]

$\vec{F} = 6.9 \times 10^3\,N$ [forward]

p 213

46. $m = 0.80\,kg$ (+)

$\vec{V}_1 = 12\,m/s\,[N]$

$\vec{V}_2 = 9.5\,m/s\,[S]$ (−)

$\Delta t = 0.065\,s$

a) $\vec{p}_1 = m\vec{V}$

$\vec{p}_1 = (0.80\,kg)(12\,m/s\,[N])$

$\vec{p}_1 = 9.6\,kg\cdot m/s\,[N]$

b) $\Delta\vec{p} = m\Delta\vec{V}$ OR find p_2 then Δp

$\Delta\vec{p} = 0.80\,kg(-9.5\,m/s - 12\,m/s)$

$\Delta\vec{p} = 0.80\,kg(-21.5\,m/s)$

$\Delta\vec{p} = -17.2\,kg\cdot m/s$

$\Delta\vec{p} = 17\,kg\cdot m/s\,[S]$

c) $\vec{J}_{\text{ball on wall}} = 17\,kg\cdot m/s\,[N]$

change in momentum of ball (impulse of the wall on the ball)

d) $\vec{F}\Delta t = \vec{J}$

$\vec{F} = \dfrac{\vec{J}}{\Delta t}$

$\vec{F} = \dfrac{17\,kg\cdot m/s\,[N]}{0.065\,s}$

$\vec{F} = 2.6\times10^2\,N\,[N]$

(the force of the ball on the wall)

e) $\vec{F}_{\text{wall on ball}} = 2.6\times10^2\,N\,[S]$

Impulse + Momentum

- Preliminary Questions
- Data / Observations
  - sample graphs (d-t, v-t, F-t) for each elastic (be sure to label)
  - data table
- Analysis
  - be sure to show work (i.e. sample calculation)
  - be sure to answer questions completely
  - revisit the preliminary questions
    - look at the difference in the two elastics
    - look at the velocity graph and think about how the graph would be different if the cart stopped $\Rightarrow \Delta v \Rightarrow$??