Ch 6

#5. (A) $(.145\,Kg)V = (.003\,Kg \times 1.5\times10^{3}\,m/s)$

$V = 31.03\,\frac{m}{s}$

(B) $KE_{BALL} = \frac{1}{2}(.145\,Kg \times 31.03\,\frac{m}{s})^2 = 69.8\,J$

$KE_{BULLET} = \frac{1}{2}(.003\,Kg \times 1.5\times10^{3}\,m/s)^2 = 3375\,J$

BULLET HAS MORE KINETIC ENERGY.

#15. $V_f = V_0 + at$

$0 = 25\,\frac{m}{s} + at$

$a = \frac{-25\,\frac{m}{s}}{t}$

$\Delta x = V_0 t + \frac{1}{2}at^2$

$1.2\,m = (25\,\frac{m}{s} \times t) + \frac{1}{2}(\frac{-25}{t})t^2$

$1.2\,m = 25t - 12.5t$

$t = .096\,s$

(B) $\bar{F} = \frac{\Delta mV}{T} = \frac{m(V_f - V_0)}{T} = \frac{1400(25)}{.096} = 3.65\times10^{5}\,N$

(C) $\bar{a} = \frac{\Delta V}{\Delta t} = \frac{-25}{.096} = -260\,\frac{m}{s^2}$

#20. $mV_{BULLET} = mV_{GUN}$

$(.005\,Kg \times 300\,m/s) = (\frac{30N}{9.8})V_{GUN}$

$.5\,\frac{m}{s} = V_{GUN}$

(B) $(.005\,Kg)(300\,\frac{m}{s}) = (\frac{700\,N}{9.8})V$

$V_{GUN} = .021\,\frac{m}{s}$

#47. $I = \Delta mV = m(V_f - V_i) = m(15\,\frac{m}{s} - 22\,\frac{m}{s}) =$

$= (.4\,Kg)(37\,m/s) = 14.8\,\frac{Kg\,m}{s}$

~~TRUCK~~

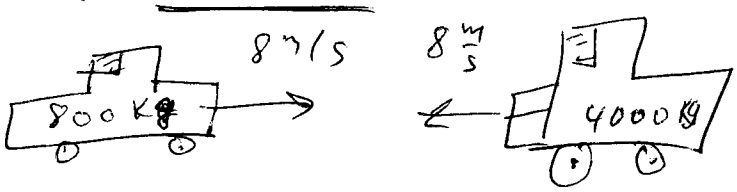
~~#49. $Ft = \Delta mV$~~ ~~MASS OF TRUCK, JUST DRIVER~~

~~$F_{TRUCK} = \frac{\Delta mV}{\Delta t} = \frac{80Kg(V_f - V_i)}{.125} = \frac{80Kg(8\,\frac{m}{s} - 0\,\frac{m}{s})}{.125} = 640N$~~

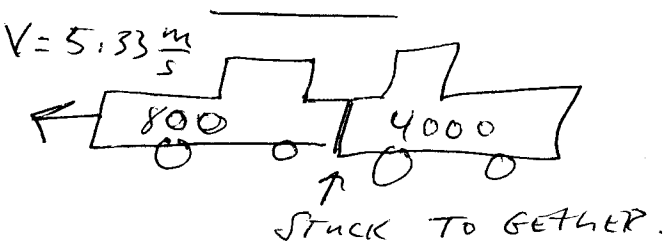
~~DRIVER~~

~~$F_{DRIVER} = \frac{\Delta mV}{\Delta t} = \frac{80Kg(8\,\frac{m}{s} - 0)}{.125} = 640N$~~

49. INITIAL



FINAL



$$m_1 v_{1i} + m_2 v_{2i} = (m_1 + m_2) v_f$$

$$(4000\,kg)(8\,\tfrac{m}{s}) - (800\,kg)(8\,\tfrac{m}{s}) = (800\,kg + 4000\,kg)\,V$$

$$\boxed{V = 5.33\,\tfrac{m}{s}}$$

$$F_{CD} = ma = m\frac{\Delta v}{\Delta t} = (80\,kg)\frac{8 + 5.33\,\tfrac{m}{s}}{.12} = 8886.67\,N$$

$$F_{TD} = ma = (80\,kg)\left(\frac{8 - 5.33}{.12}\right) = 1780\,N$$