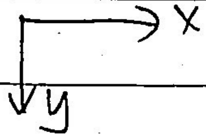
138. 3-3

$mgh=\frac{1}{2}mv_y^2 \Rightarrow v_y=\sqrt{2gh}=4\,m/s$

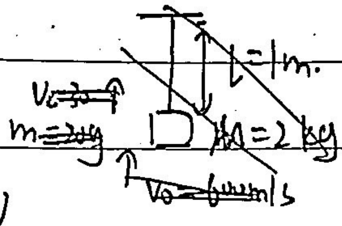
~~$v=\sqrt{v_x^2+v_y^2}=2\sqrt{5}\,m/s$~~ $\vec{v}=2\vec{i}+4\vec{j}\ m/s$



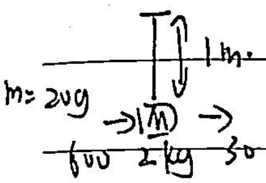
$\therefore \vec{F}\cdot t=m\cdot 0-m\vec{v}$ 取 $t=1s$, $m=20kg$

$\Rightarrow \vec{F}=-40\vec{i}-80\vec{j}\,(N)$

138. 3-4



(1) ~~$Mg=F_{T}+F_{T}$~~



$M\cdot 0+m\cdot v_0=M\cdot v_1+m\cdot v$

$\Rightarrow v_1=5.7\,m/s$

$F_T-Mg=M\frac{v_1^2}{l} \Rightarrow F_T=84.98N$

(2) $\vec{I}=m\vec{v}-m\vec{v}_0=-11.4\ N\cdot s$ 向→为+

138. 3-6

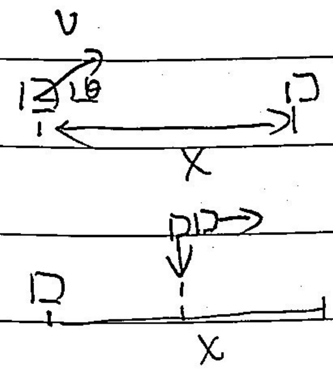
(1) $F=0$ 时 $\Rightarrow t=3\times10^{-3}s$ 记为 τ

(2) $\vec{I}=\int\vec{F}dt=\left(400t-\frac{2}{3}\times10^{5}t^2\right)\Big|_0^{\tau}$

$=0.6\ N\cdot s$ 向枪口为+

(3) $\vec{I}=m\cdot\vec{v}-m\cdot 0 \Rightarrow m=2\times10^{-3}kg$.

139. 3-9



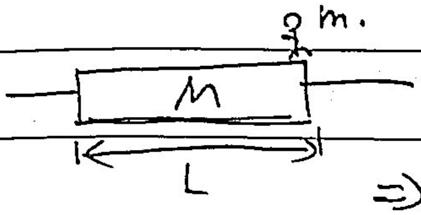
在最高处: $2m\vec{v}_1=m\cdot 0+m\cdot\vec{v}_2$

水平方向. $\Rightarrow \vec{v}_2=2\vec{v}_1$

$\therefore$ 第二块落在 $\frac{x}{2}+\frac{x}{2}\times\frac{v_2}{v_1}=\frac{3}{2}x$ 处

距出发点.

139. 3-10



向→为+.

$\vec{I} = \Delta\vec{P}$

$\Rightarrow \int_0^{\tau} \vec{f}\,dt = Mv + m(v-u) - 0$

$\boxed{0 = Mv_0 + m(v_0 - u) \Rightarrow v_0 = \frac{mu}{M+m}}$ X 无用

$\Rightarrow \int_0^{\tau} -k\vec{v}\,dt = Mv + m(v-u)$

$\Rightarrow -k\int_0^{\tau} dx = Mv + m(v-u)$

$\Rightarrow -kx(\tau) = Mv + m(v-u)$ v为人在船上头停下后最终船速

同理有 $-kx(\tau') + kx(\tau) = 0 - m(v-u) - Mv$

$\int_{\tau}^{\tau'} \vec{f}\,dt$ ∴ $\Delta x = x(\tau') = 0$