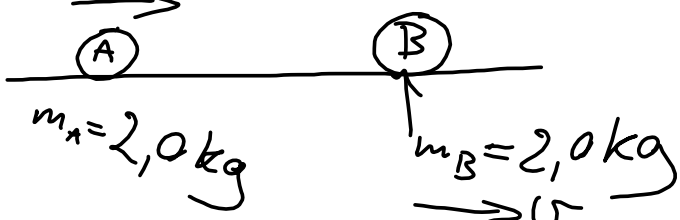
5.06 $v_{A1} = 3{,}0\ m/s$ $v_{B1} = 0$



: Før

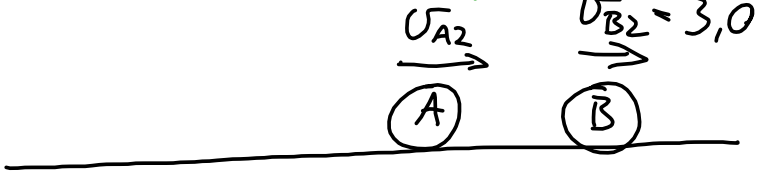
a)

Etter

$$m_A \cdot v_{A1} + m_B \cdot v_{B1} = m_{AB} \cdot v$$

$$v = \frac{m_A \cdot v_{A1}}{m_{AB}} = \frac{2{,}0\,[kg] \cdot 3{,}0\,[m/s]}{4{,}0\,[kg]} = 1{,}5\,[m/s]$$

b)



Etter

$$m_A \cdot v_{A1} + m_B \cdot v_{B1} = m_A \cdot v_{A2} + m_B \cdot v_{B2}$$

$$m_A \cdot v_{A2} = m_A \cdot v_{A1} - m_B \cdot v_{B2}$$

$$v_{A2} = \frac{m_A \cdot v_{A1} - m_B \cdot v_{B2}}{m_A} = \frac{2{,}0 \cdot 3{,}0 - 2{,}0 \cdot 3{,}0}{2{,}0} = 0{,}0$$

c) a) $E_{K1} = \frac{1}{2} m_A \cdot v_{A1}^2 = \frac{1}{2} \cdot 2{,}0 \cdot 3{,}0^2 = 9{,}0\ [J]$ ($+\frac{1}{2} m_B v_{B1}^2$, $v_{B1} = 0$)

$kg \cdot \frac{m^2}{s^2} = kg \frac{m}{s^2} \cdot m = J$

$E_{K2a} = \frac{1}{2} \cdot m_{AB} \cdot v^2 = \frac{1}{2} 4{,}0 \cdot 1{,}5^2 = 4{,}5\ [J]$

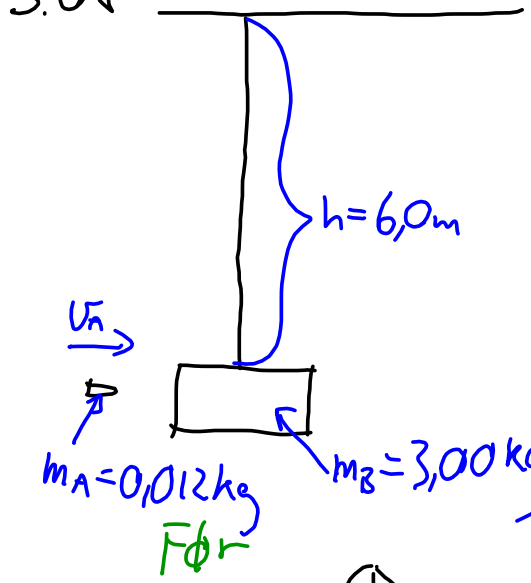
$E_{K1} \neq E_{K2}$ Uelastisk støt

b) $E_{K2b} = \frac{1}{2} \cdot m_A v_{A2}^2 + \frac{1}{2} m_B \cdot v_{B2}^2 = \frac{1}{2} 2{,}0 \cdot 3{,}0^2 = 9{,}0\ [J]$

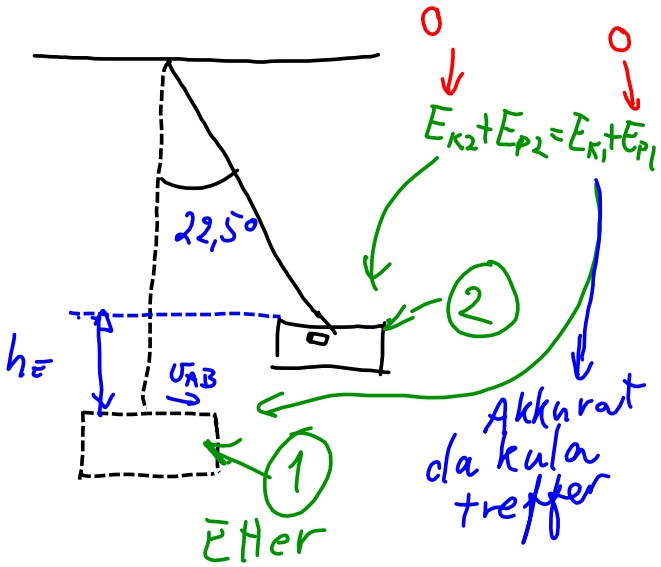
$v_{A2} = 0$

Da $E_{K1} = E_{K2b} \Rightarrow$ Elastisk støt

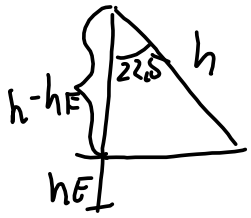
5.07



Før



Finn h_E:



$\cos 22{,}5° = \frac{h-h_E}{h}$

$h\cdot\cos 22{,}5° = h - h_E$

$h_E = h - h\cdot\cos 22{,}5° = h(1-\cos 22{,}5°)$

$= 6{,}0(1-\cos 22{,}5°) = 0{,}457\,m$

0 → $E_{P1}+E_{K1} = E_{P2}+E_{K2}$ ← 0

$E_K = E_{P2}$

$\frac{1}{2}m\cdot v_{AB} = mgh_E$

$m = m_A + m_B = 0{,}012\,kg + 3{,}00\,kg = 3{,}01\,kg$

$v_{AB} = \sqrt{2\cdot g\cdot h_E} = \sqrt{2\cdot 9{,}81\cdot 0{,}46} = 3{,}0\ m/s$

(m/s^2, m)

$m_A\cdot v_A + m_B\cdot v_B = m\cdot v_{AB}$

v_B: Kassa er i ro før kula treffer

$v_A = \frac{m\cdot v_{AB}}{m_A} = \frac{3{,}01\,[kg]\cdot 3{,}0\,[m/s]}{0{,}012\,[kg]} = 753\,[m/s]$

Impuls

$$I = F \cdot t = \sum F \cdot \Delta t$$

Impuls er lik forandring av bevegelsesmengde

$$\sum F \cdot \Delta t = \Delta p$$

Δp: forandring; p: bevegelsesmengde

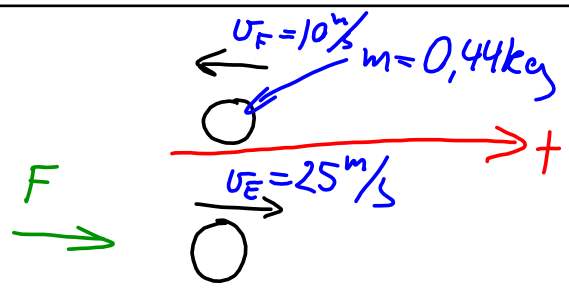
5.09

a) $I = F \cdot t = 200[N] \cdot 6{,}0[s] = 1200[Ns]$

b) $\Delta p = I = 1200\left[\frac{kg \cdot m}{s^2} \cdot s\right] = 1200[kg \cdot m/s]$

N; m; v

5.10



$p_F = v_F m = 10 \cdot 0{,}44\ [m/s \cdot kg]$
$= 4{,}4\ [m/s \cdot kg]$

$p_E = v_E \cdot m = 25 \cdot 0{,}44 =$

$$F = \frac{\Delta p}{\Delta t} = \frac{p_E - p_F}{\Delta t}$$

$$= \frac{(25 \cdot 0{,}44 - (-10 \cdot 0{,}44))\ [kg\ m/s]}{0{,}020\ [s]} = \frac{0{,}44 \cdot 35\ [kg\ m/s^2]}{0{,}020} = 770\,[N]$$