Phy 4A Review

Friday, November 4, 2016 11:17 AM

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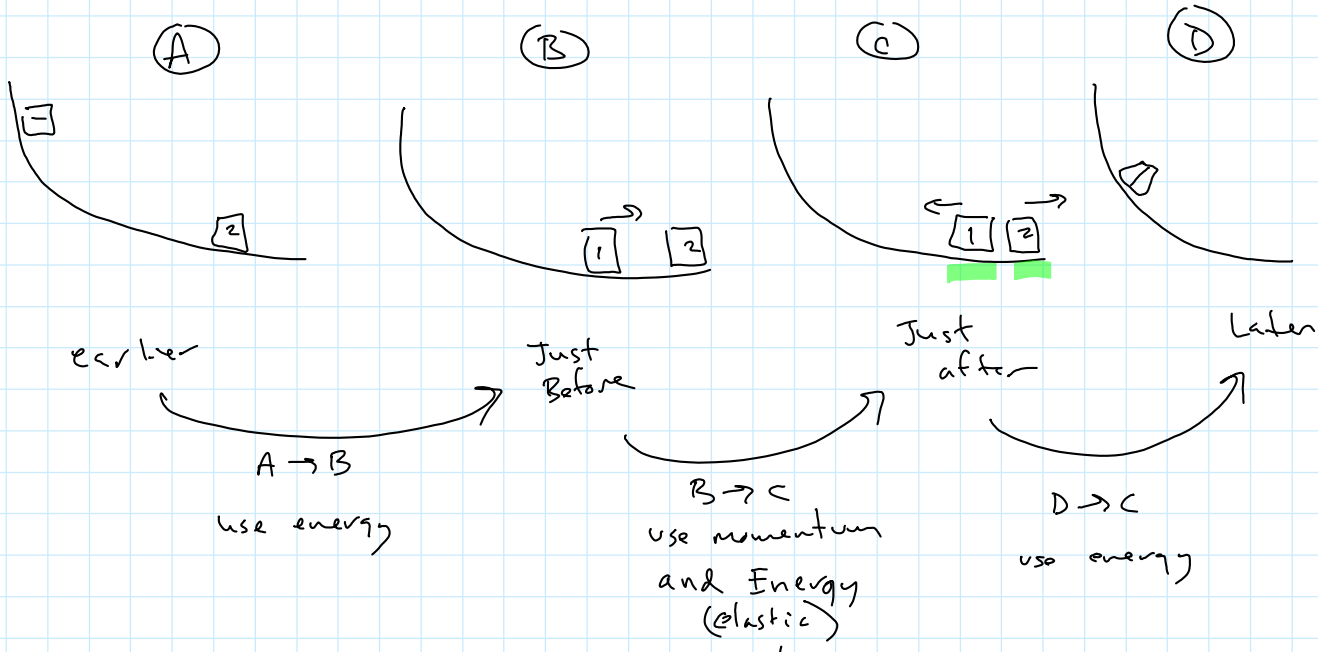


$$P_B = P_C \rightarrow +$$

$$P_{1B} + P_{2B} = P_{1C} + P_{2C}$$

$$m_1 v_{1B} + 0 = m_1\left[-|\vec{v}_{1C}|\right] + m_2 v_{2C}$$

Find v_{1B}:

$$E_A = E_B$$

$$m_1 gh = \frac{1}{2} m_1 v_{1B}^2$$

$$v_{1B} = \sqrt{2gh}$$

Solve for v_{1C} and v_{2C}

Find v_{2C}:

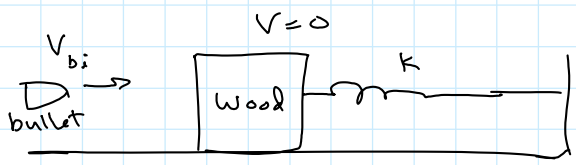
$$E_A = E_C$$

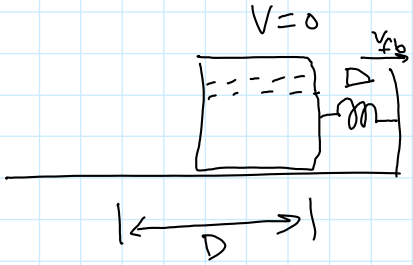
$$m_1 gh = \frac{1}{2} m_1 v_{1C}^2 + \frac{1}{2} m_2 v_{2C}^2$$

Now, use energy to get final height of m_1

$$E_C = E_D$$

9-89





$M_b = 5\ g$

$V_{bi} = 400\ \frac{m}{s}$

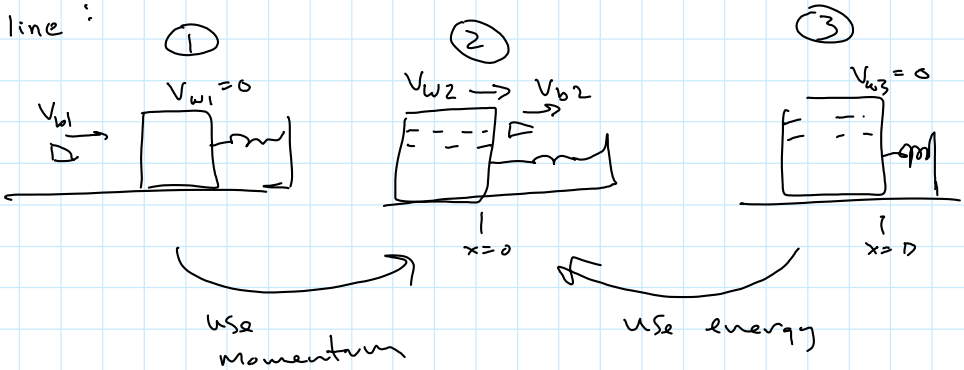
$m_w = 1\ kg$

$k = 900\ \frac{N}{m}$

$D = 5\ cm$

Find: V_f for bullet

Time line:



$P_1 = P_2 \rightarrow +$

$P_{b1} + P_{w1} = P_{b2} + P_{w2}$

$m_b V_{b1} + 0 = m_b V_{b2} + m_w V_{w2}$

2 unknowns

Find V_{w2} using energy:

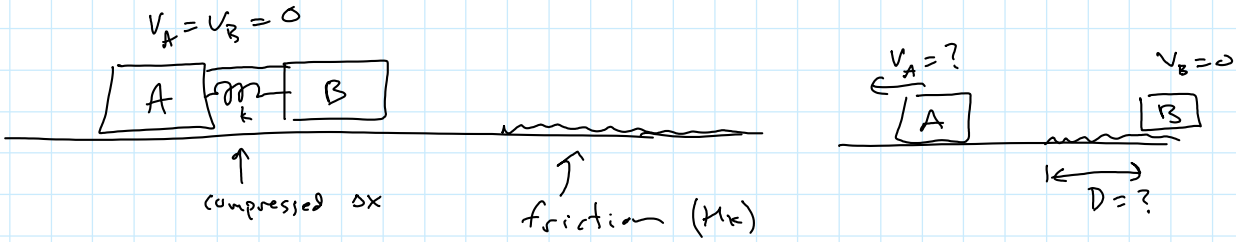
$E_2 = E_3$ (No friction)

$\frac{1}{2} m_w V_{w2}^2 = \frac{1}{2} k D^2$

$V_{w2} = \sqrt{\frac{k}{m}}\, D$

$m_b V_{b1} = m_b V_{b2} + m_w \sqrt{\frac{k}{m_w}}\, D$

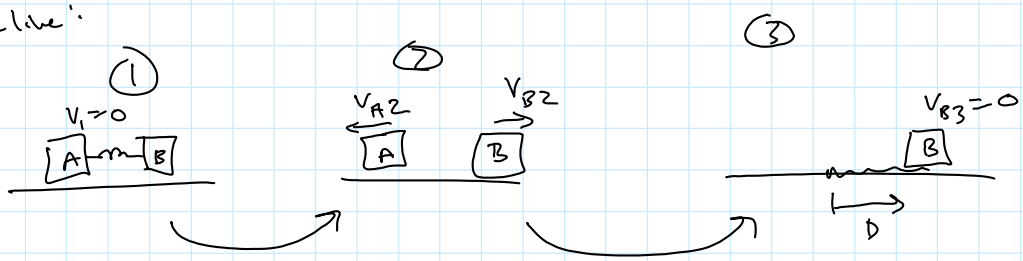
Solve for V_{B2}



given: $m_A, m_B, \mu_k, k, \Delta x$

find: V_{Af} and D

Timeline:



use both energy and Momentum to find V_{A2} and V_{B2}

use energy to find D

$P_1 = P_2 \rightarrow +$

$0 = P_{A2} + P_{B2}$

$0 = m_A(-|V_{A2}|) + m_B V_{B2}$

$m_A V_{A2} = m_B V_{B2}$

$E_1 = E_2$

$\frac{1}{2} k (\Delta x)^2 = \frac{1}{2} m_A V_{A2}^2 + \frac{1}{2} m_B V_{B2}^2$

Solve for V_{A2} and V_{B2}

then,

$E_2 + W_{friction} = E_3$

$\frac{1}{2} m_B V_{B2}^2 - f_k D = 0$

$\frac{1}{2} m_B V_{B2}^2 = \mu_k (m_B g) D$

H

Solve for D