Phy 4A Office Hour - 11/12

Saturday, November 12, 2016 10:46 AM

Sample exam: #1

a) $\Delta K = W$

$= F d$

$D > A = B > C$

---

b) $I = F t$

$D > A = B > C$

---

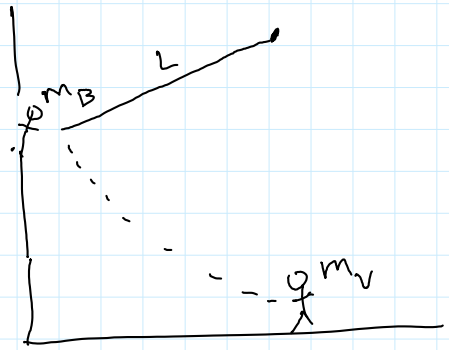
c) $I = \Delta p$ $\quad \Delta p = J$

$= F t$

$D > A = B > C$

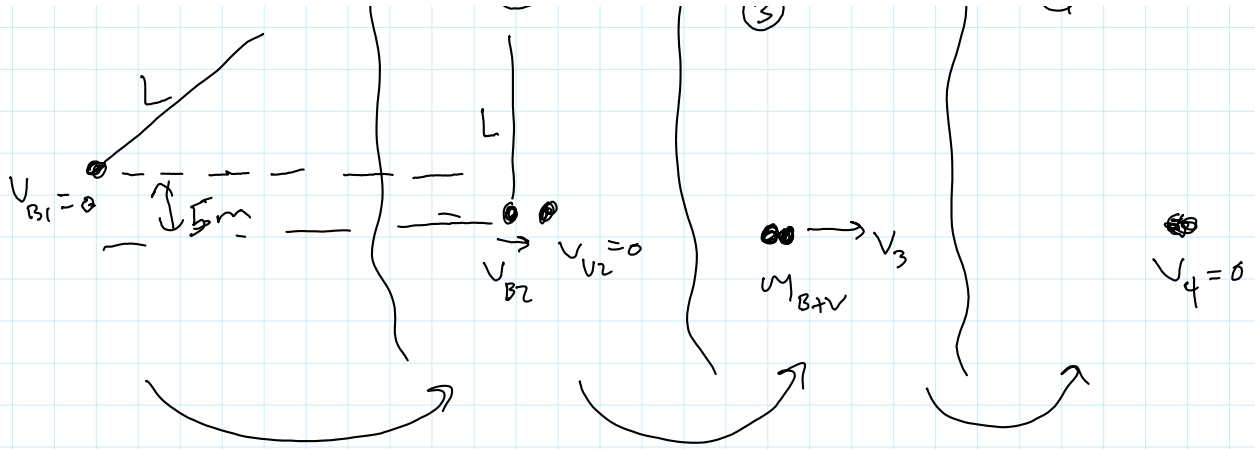
---

3)



timeline:

initial ① | Just Before ② | Just After ③ | Later ④



1→2
use energy to find V_{B2}

No friction here

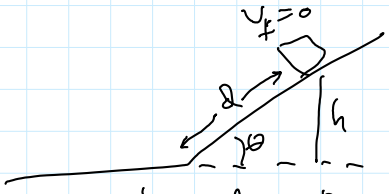
2→3
use momentum to find V_3

3→4
use energy to find the distance

Sample Exam #4

initial

final



$h = d \sin\theta$

E_i

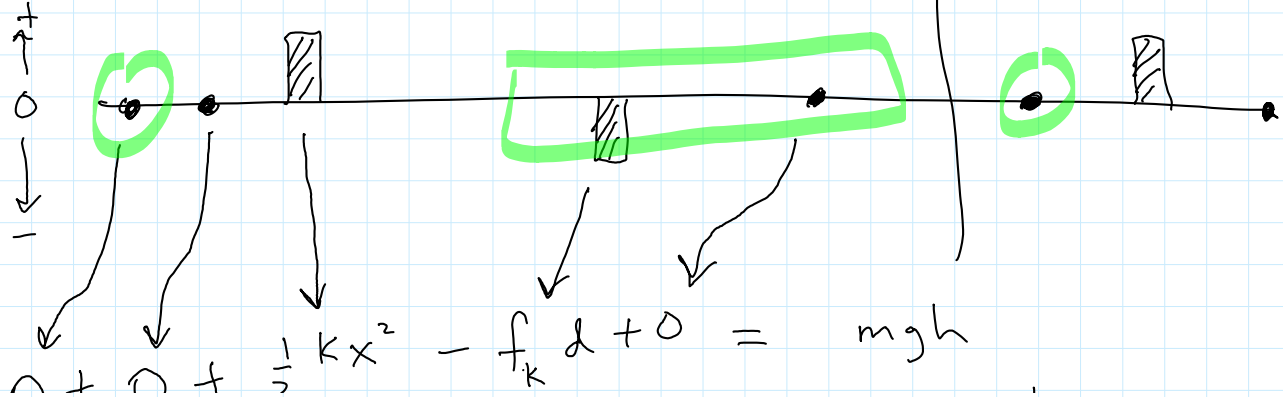
$K_i \quad U_{g\,i} \quad U_{sp\,i}$

During

$W_{friction} \quad W_{ext}$

E_f

$K_f \quad U_{sf} \quad U_{sp_f}$



$$\frac{1}{2}kx^2 - f_k d + 0 = mgh$$

$$\frac{1}{2}kx^2 - \mu_k \underbrace{(mg\cos\theta)}_{N} d = mg\, d\sin\theta$$

solve for d

Collisions

3 types: 1) something blows up
1 object becoming mult. objects
always inelastic $K_i \neq K_f$

2) things stick together
mult objects become one
always inelastic $K_i \neq K_f$

3) objects bounce off each other

Don't know

sometimes Elastic $K_i = K_f$

Sometimes Inelastic $K_i \neq K_f$

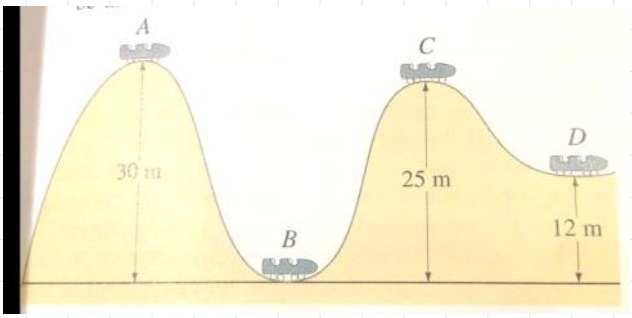
Need more info

for all collisions ($\Sigma F = 0$)

$$\vec{P}_i = \vec{P}_f$$

Sample #2

Sam's #2



a) $E_A = E_B = E_C = E_D$

$mg(30\text{ m}) = \frac{1}{2}mv_B^2 = \frac{1}{2}mv_C^2 + mg(25\text{ m}) = \frac{1}{2}mv_D^2 + mg(12\text{ m})$

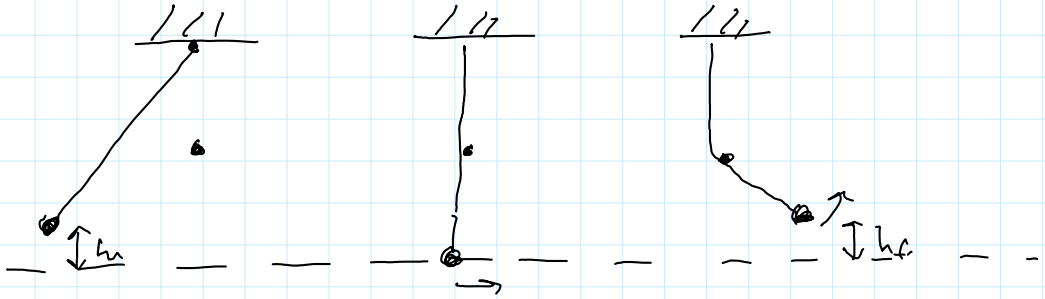
b) $E_A + W_{friction} = E_B$

$\frac{1}{2}mv_A^2 + mg(30\text{ m}) - f_k d = \frac{1}{2}mv_B^2$

$\frac{1}{2}mv_A^2 + mg(30) - \left(\frac{1}{5}mg\right)(45\text{ m}) = \frac{1}{2}mv_B^2$

Solve for v_B

Ch 8 #68

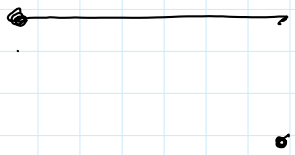


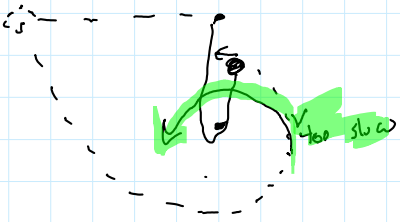
a) $v_i = 0$ $\quad v_f = 0$

$mgh_i = mgh_f$

$h_i = h_f$

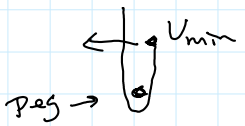
b)





1st: find V_{min} for circular motion around the peg

2nd: Link Start to end with energy



FBD

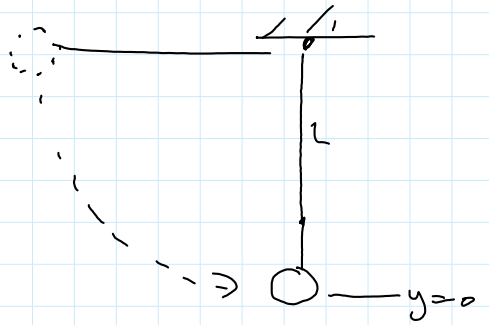
$\Sigma F_{radial} = \frac{mV^2}{R}$ at

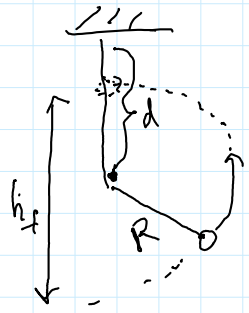
$T + mg = \frac{mv^2}{R}$

$T \to 0$ at V_{min}

$mg = \frac{m V_{min}^2}{R}$

$V_{min} = \sqrt{Rg}$





$E_i = E_f$

$mgh_i = \frac{1}{2} m V_{min}^2 + mg h_f$

$h_i = L$

$V_{min} = \sqrt{Rg}$

$h_f = 2R$

$h_f = 2(L-d)$

$d + R = L$

$R = L - d$

$V_{min} = \sqrt{(L-d)g}$

Solve for d in terms of L

Ch 9 #75

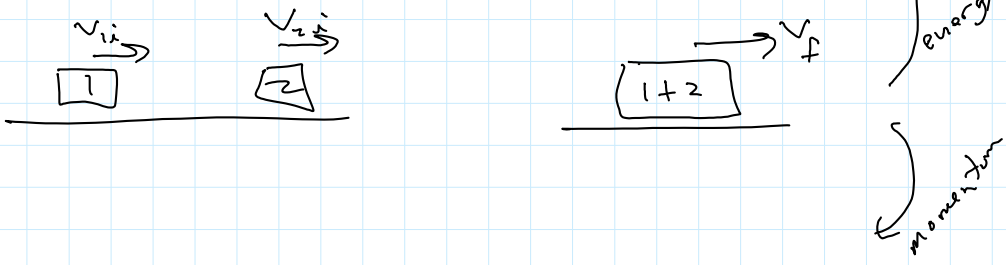
b) energy prob: $E_i = E_f$

$$K_{1i} + K_{2i} = K_{1+2} + U_{sp}$$

$$\frac{1}{2} m_1 v_{1i}^2 + \frac{1}{2} m_2 v_{2i}^2 = \frac{1}{2}(m_1+m_2) v_f^2 + \frac{1}{2} k x_{max}^2$$

v_f: at max compression

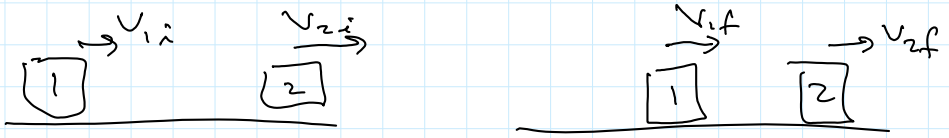
a) momentum



$$p_{1i} + p_{2i} = (p_{1+2})_f$$

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

c) momentum and energy



$$\left.\begin{array}{ll} p: & p_{1i} + p_{2i} = p_{1f} + p_{2f} \\ E: & K_{1i} + K_{2i} = K_{1f} + K_{2f} \end{array}\right\} \text{2 unknowns}$$