1. according to the conservation of momentum

$m\vec{v}_0 = m_A\vec{v}_A + m_B\vec{v}_B + m_C\vec{v}_C$

x components: $mv_0 = m_A\frac{x_A}{t} + m_B\frac{x_B}{t} + m_C\frac{x_C}{t}$

y components: $0 = m_A\frac{y_A}{t} + m_B\frac{y_B}{t} + m_C\frac{y_C}{t}$

z components: $0 = m_A\frac{z_A}{t} + m_B\frac{z_B}{t} + m_B\frac{z_C}{t}$

Hence the coordinates of part C. is (1180m 140m 155m)

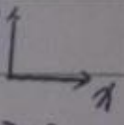
根据同里去 $\vec{r}_A$. $\vec{r}_B$. $\vec{r}_C$

用 $\vec{H}_0 = \sum_{n=1}^{3} \vec{r}_n \times m\vec{v}_n = \vec{r}_A \times m_A\vec{v}_A + \vec{r}_B \times m_B\vec{v}_B + \vec{r}_C \times m_C\vec{v}_C$

$= \cdots$

3. According to the conservation of momentum

$m\vec{v}_0 = m\vec{v}_A + m\vec{v}_B + m\vec{v}_C$

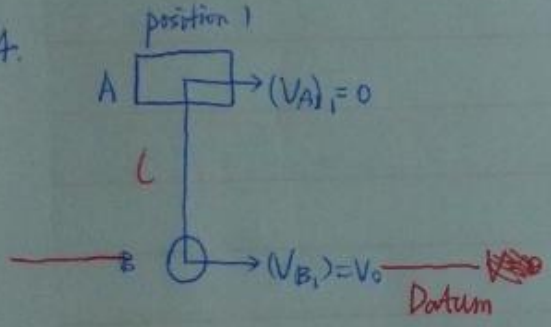


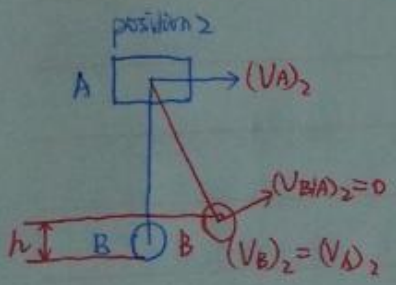
x components: $mv_0\cos 45° = mv_A\sin 43° + mv_B\sin 37.4° + mv_C\cos 30°$

y components: $mv_0\sin 45° = mv_A\cos 43° + (-mv_B\cos 37.4°) + mv_C\sin 30°$

Hence $v_A =$ $v_B =$

4.





B reaches its maximum elevation

position 1: $(\vec{V}_A) = 0 \quad (\vec{V}_B)_1 = \vec{V}_0$

position 2: $(V_{B/A})_2 = 0$

hence $(V_B)_2 = (V_A)_2 + (V_{B/A})_2 = (V_A)_2$

use the impulse - momentum principle

$$m_B V_0 = (m_A + m_B)(V_A)_2$$

$$\begin{cases} (V_A)_2 = \dfrac{m_B}{m_A + m_B} V_0 \\ (V_B)_2 = \dfrac{m_B}{m_A + m_B} V_0 \end{cases}$$

$$T_1 + V_1 = T_2 + V_2$$

hence

$$\frac{1}{2} m_B V_0^2 + m_A g l = \frac{1}{2}(m_A + m_B)(V_A)_2^2 + m_A g l + m_B g h$$

$$h = \frac{V_0^2}{2g} - \frac{m_B}{m_A + m_B} \cdot \frac{V_0^2}{2g}$$

$$= \frac{m_A}{m_A + m_B} \frac{V_0^2}{2g}$$