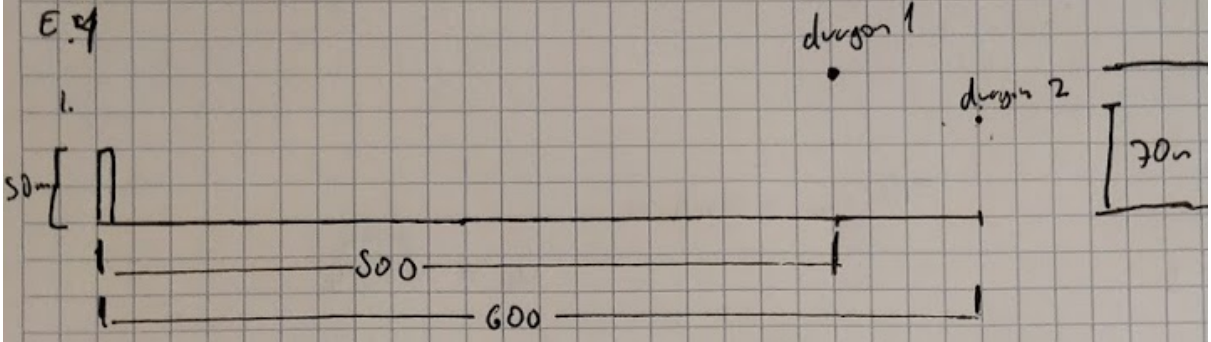
Óscar Hernández

E.4

1.



2.

$v = ?$ $\quad x = x_0 + v_x \cdot t \rightarrow t = \frac{500}{v_x}$

$\alpha = ?$ $\quad y = y_0 + v_y \cdot t + \frac{1}{2} g \cdot t^2$

$\downarrow$

$$100 = 50 + (v_0 \cdot \sin\alpha) \cdot \frac{500}{v_0 \cdot \cos\alpha} - \frac{1}{2} g \cdot \left(\frac{500}{v_0 \cos\alpha}\right)^2$$

$$50 = \frac{500 \sin\alpha}{\cos\alpha} - \frac{1}{2} g \left(\frac{500^2}{v_0^2 \cdot \cos^2\alpha}\right)$$

$\downarrow$ $\quad \tan\alpha$

$\rightarrow \alpha = 45°$

$$\left[v_{0_1}^2 = \frac{-500^2 \cdot 9{,}8}{2(50 - 500 \tan\alpha)\cos^2\alpha} = \right. 73{,}02 \text{ m/s}$$

$$\left[v_{0_2}^2 = \frac{-600^2 \cdot 9{,}8}{2(20 - 600 \tan\alpha)\cos^2\alpha} = \right. 78{,}03 \text{ m/s}$$

E2

n = nº plantas $\quad h = 1{,}5\ m \quad cm =$

$$Cm = \sum_{i=1}^{n} \frac{m \cdot (i \cdot h) + cm}{n \cdot m}$$

E_3

a1

$y = 10m$

$E_{c\,max} = E_{p\,h=0}$

$[x = x]$

$[y = v_0 \cdot T + \frac{1}{2} g T^2]$

$v_0 = \sqrt{2gh}$

$[v = e \cdot v_0]$

a2

$E_{c\,h=0} = E_{p\,max} + E_{c\,v=2}$

$[x = x]$

$[y = v \cdot T + \frac{1}{2} g T^2]$

$v_0 = \sqrt{2gh + 2^2}$

$[v = e\,v_0]$

a3

$E_{c\,h=0} = E_{p\,max} + E_{c\,v=2\cos 60}$

$[x = x_0 + v \cdot \cos 30 \cdot t]$

$[y = y_0 + v \cdot \sin 30 \cdot t + \frac{1}{2} g t^2]$

$v_0 = \sqrt{2gh + 2\cos 60}$

$[v = e v_0]$

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E.4

a1

$E_{pT} = E_2 + E_1$

$h_1 = l_1 \cdot \sin\alpha$

$h_2 = l_2 \cdot \sin\alpha$

$E_{pT} = m_2 g l_2 \sin\alpha - m_1 g l_1 \sin\alpha$

a2

Sistema en equilibrio → Σ fuerzas y momentos $= 0$.

$\Sigma F_x = 0$

$\Sigma F_y = P_1 + P_2 = 0$

$\Sigma \vec{M} = P_2 l_2 / \cos\alpha + P_1 \cdot l_1 / \cos\alpha = 0$

a3

$E_{p2} = E_{p1}$

$m_1 g l_1 \sin\alpha = m_2 g l_2 \sin\alpha$

$m_1 l_1 = m_2 l_2 \rightarrow m l$

~~$m_2 l_2 \sin\alpha = m$~~

~~$m l \sin\alpha = m l \sin\alpha$~~ → $\sin\alpha = \sin\alpha$