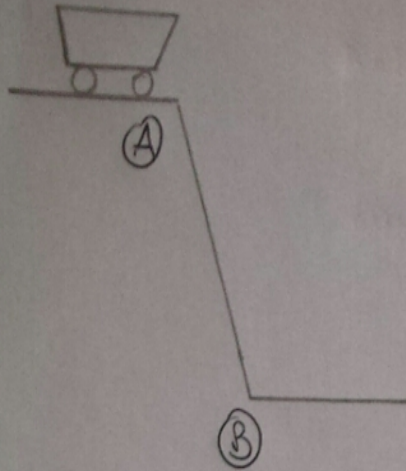


CALCULATIONS 2cs:



INFORMATIONS

- $m = 480 \text{ kg}$  (CONSIDERING 40 kg FOR AIR)
- $h_A = 7,7 \text{ m}$
- $h_B = 1,4 \text{ m}$
- $v_B = 45 \text{ km/h} = 12,5 \text{ m/s}$

④

$$E_c = \frac{1}{2} m v_A^2 = 0$$

$$E_p = mgh_A = 480 \text{ kg} \cdot 9,81 \frac{\text{N}}{\text{kg}} \cdot 7,7 \text{ m} = 36,258 \text{ KJ}$$

$$E_m = E_c + E_p = \frac{1}{2} m v_A^2 + 36,258 \text{ KJ}$$

③

$$E_c = \frac{1}{2} m v_B^2 = \frac{1}{2} \cdot 480 \text{ kg} \cdot (12,5 \text{ m/s})^2 = 37,5 \text{ KJ}$$

$$E_p = mgh_B = 480 \text{ kg} \cdot 9,81 \frac{\text{N}}{\text{kg}} \cdot 1,4 \text{ m} = 8,005 \text{ KJ}$$

$$E_m = E_c + E_p = 37,5 \text{ KJ} + 8,005 \text{ KJ} = 45,505 \text{ KJ}$$

$$E_{m_A} = E_{m_B} \rightarrow \frac{1}{2} m v_A^2 + 36,258 \text{ KJ} = 45,505 \text{ KJ}$$

$$\sqrt{\frac{2 \cdot (45,505 - 36,258) \text{ KJ}}{m}} = \frac{2 \cdot 9,247 \text{ KJ}}{480 \text{ kg}} = 38,5 \frac{\text{m}^2}{\text{s}^2}$$

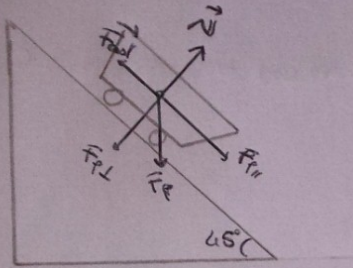
$$v_A = \sqrt{38,5 \frac{\text{m}^2}{\text{s}^2}} = 6,2 \frac{\text{m}}{\text{s}}$$

so:

$$E_{m_B} = \frac{1}{2} m v_B^2 + mgh_B = \frac{1}{2} \cdot 480 \text{ kg} \cdot 38,5 \frac{\text{m}^2}{\text{s}^2} + 480 \text{ kg} \cdot 9,81 \frac{\text{N}}{\text{kg}} \cdot 1,4 \text{ m} = 45,500 \text{ KJ}$$

$$E_{c_A} = \frac{1}{2} m v_A^2 = 2240 \text{ KJ}$$

res:



INFORMATIONS:

$$m = 480 \text{ Kg} \quad \Delta t = 1 \text{ s}$$

$$\theta = \text{ESTIMATO } 45^\circ$$

$$(\searrow) F_{\text{res } x} = F_{p\parallel} - F_{\text{fric}} = ma$$

$$(\uparrow) F_{\text{res } y} = N - F_{p\perp} = 0$$

$$A = ?$$

WE DON'T KNOW FRICTIONAL FORCES SO WE DON'T CONSIDER IT.

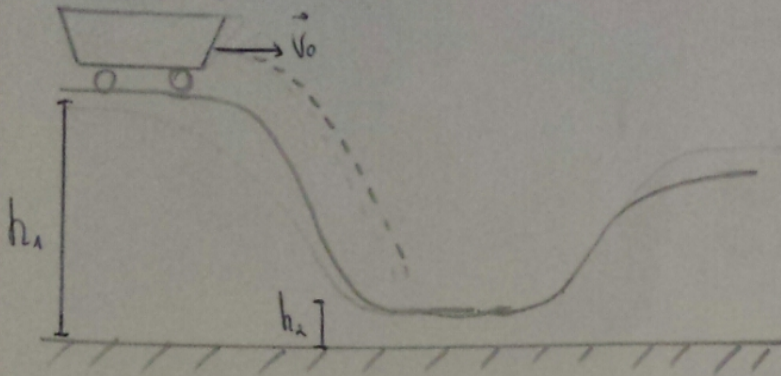
$$F_{p\parallel} = mg \cdot \sin 45^\circ = 480 \text{ Kg} \cdot 9,81 \frac{\text{N}}{\text{Kg}} \cdot \sin 45^\circ = 3329,62 \text{ N}$$

$$F_{p\parallel} = ma \rightarrow a = \frac{F_{p\parallel}}{m} = \frac{3329,62 \text{ N}}{480 \text{ Kg}} = 6,9 \text{ m/s}^2$$

$$a = \frac{\Delta v}{\Delta t} \rightarrow \Delta v = a \cdot \Delta t = 6,9 \text{ m/s}^2 \cdot 1 \text{ s} = 6,9 \text{ m/s}^2$$



CALCULATIONS 3ASA:



INFORMATIONS:

$$\vec{v}_0 = 6,2 \text{ m/s}$$

$$t = 2 \text{ s}$$

$$h_1 = 7,7 \text{ m}$$

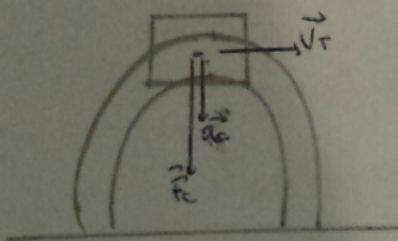
$$h_2 = 1,7 \text{ m}$$

$$h_{\text{free}} = h_1 - h_2 = (7,7 - 1,7) \text{ m} = 6 \text{ m}$$

$$\begin{cases} v_{0x} = v_0 \\ v_{0y} = -gt \end{cases} \quad \begin{cases} x = v_{0x}t \\ y = h - \frac{1}{2}gt^2 \end{cases}$$

$$y = 6 - \frac{g}{2v_0^2} x^2 = 6 - \frac{9,81 \text{ N/kg}}{2 (6,2 \text{ m/s})^2} x^2 = 6 - 0,128 x^2$$

$$y = 6 - 0,128 x^2$$



$$m = 480 \text{ kg}$$

$$\Delta t = 2,26 \pm 0,2$$

$$r = 5 \text{ m (ESTIMATED)}$$

$$\omega = \frac{\pi}{\Delta t} = \frac{2 \cdot 3,14}{2,26 \pm 0,2} = 1,40 \text{ rad/s}$$

$$a_c = \omega^2 r = (1,40 \text{ rad/s})^2 \cdot 5 \text{ m} = 98 \frac{\text{m}}{\text{s}^2}$$

$$F_c = a_c m = 480 \text{ kg} \cdot 98 \frac{\text{m}}{\text{s}^2} = 47040 \text{ kg} \frac{\text{m}}{\text{s}^2}$$