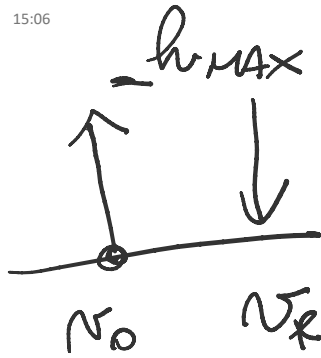


82)



$$v_f = v_0$$

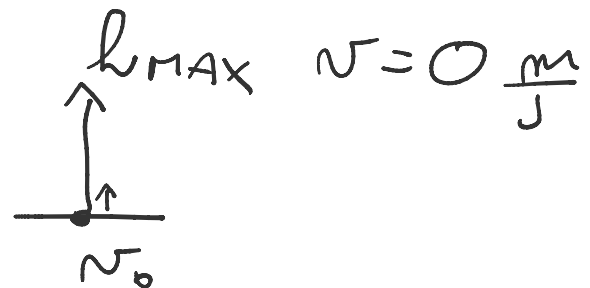
$$t_{SALITA} = t_{DISCESA} = 4 \text{ s}$$

$$y = y_0 + v_0 t - \frac{1}{2} g t^2$$

$$v = v_0 - g t$$

$$0 = v_0 - g t$$

$$v_0 = g \cdot t = 9,81 \cdot 4 = 40 \frac{\text{m}}{\text{s}}$$



87)



$$x_{FINCHIATA} = 15 \text{ m}$$

$$a = ?$$

$$v^2 = v_0^2 + 2a \Delta x$$

$$0 = v_0^2 + 2a \Delta x$$

$$a = \frac{-v_0^2}{2 \Delta x} = \frac{-30^2}{30} = -30 \frac{\text{m}}{\text{s}^2}$$

81)

310

$$R_1, T_1$$

$$R_2 = 2R_1$$

$$T_2 = 2T_1$$

$$v = \frac{2\pi R}{T}$$



$$v_1 =$$

$$v_2 =$$

$$\frac{v_1}{v_2} = \frac{\cancel{2\pi} R_1}{T_1} \cdot \frac{T_2}{\cancel{2\pi} R_2} = \frac{\cancel{R_1}}{\cancel{T_1}} \cdot \frac{2\cancel{T_1}}{2 \cdot \cancel{R_1}} = 1$$

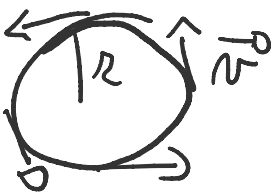
$$\frac{a_1}{a_2} = \frac{v_1^2}{R_1} \cdot \frac{R_2}{v_2^2} \quad \left\{ \begin{array}{l} \frac{v_1}{v_2} = 1 \cdot \frac{v_2}{v_2} \\ v_1 = v_2 \end{array} \right.$$

$$a = \frac{v^2}{r}$$

$$\frac{a_1}{a_2} = \frac{\cancel{v_1^2}}{\cancel{R_1}} \cdot \frac{2\cancel{R_1}}{\cancel{v_1^2}} = 2$$

334

$$v = 20 \frac{m}{s}$$



$$R = 2m$$

$$f = ?$$

.....

7-1

$$v = \frac{2\pi r}{T} = 2\pi r \cdot f$$

$$f = \frac{v}{2\pi \cdot r} = \frac{20}{2 \cdot \pi \cdot 2} = \frac{5}{\pi}$$

$\approx 1,6 \text{ Hz}$

336 $r_1 = r_2 \mid r_2 = r_1$
 $\omega_1 = 2\omega_2 \mid \omega_2$

$\left(\frac{x}{r_2} \right)$ $\left(\frac{r_2}{r_2} \right)$

$$\frac{a_1}{a_2} =$$

$$a = \frac{v^2}{r} = \frac{(\omega \cdot r)^2}{r} = \omega^2 r$$

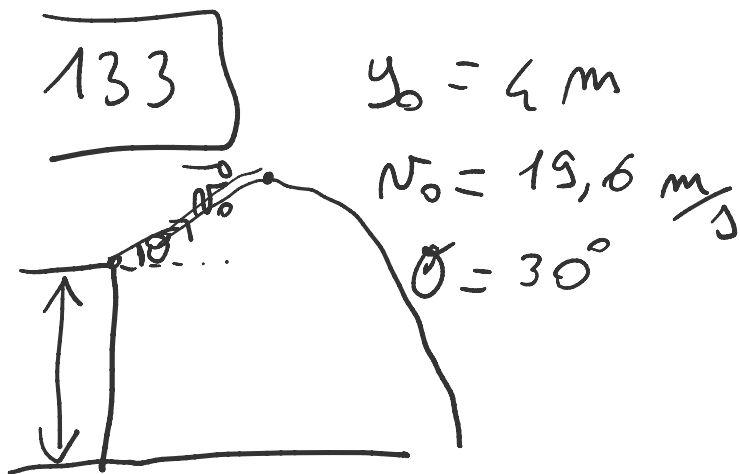
$$a_1 = \omega_1^2 \cdot r_1$$

$$a_2 = \omega_2^2 \cdot r_2$$

$$\frac{a_1}{a_2} = \frac{\omega_1^2 \cdot r_1}{\omega_2^2 \cdot r_2} = \frac{(2\omega_2)^2 \cdot r_1}{\omega_2^2 \cdot r_2}$$

$$= \frac{4 \cancel{\omega_2^2} \cdot \cancel{r_1}}{\omega_2^2 \cdot r_2} = 4$$

$$= \frac{4 \cancel{v_x^2} \cancel{v_y^2}}{\cancel{v_x^2} \cdot \cancel{v_y^2}} = 4$$



$$\begin{cases} v_{ex} = v_0 \cos \theta \\ v_{oy} = v_0 \sin \theta \end{cases}$$

$$\begin{cases} x = x_0 + v_{ox} t \\ y = y_0 + v_{oy} t - \frac{1}{2} g t^2 \end{cases}$$

$$\begin{cases} v_x = v_{ox} \\ v_y = v_{oy} - g \cdot t \end{cases}$$

$$0 = v_0 \sin \theta - g t$$

$$g t = v_0 \sin \theta$$

$$t = \frac{v_0 \sin \theta}{g} \approx \frac{19,6 \cdot 0,5}{10} \approx 1 \text{ s}$$

$$y = y_0 + v_{oy} \cdot t - \frac{1}{2} g t^2$$

$$= 4 + v_0 \cdot \sin \theta \cdot 1 - \frac{1}{2} g \cdot 1 =$$

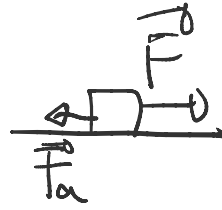
$$\approx 4 + \frac{20}{2} - \frac{1}{2} \cdot 10 = 4 + 10 - 5 \approx 9 \text{ m}$$

24. 2 - 2

175

$$m = 20 \text{ kg}$$

$$\mu = 0,3$$



$$a = 0$$

$$\sum F_x = m a_x$$

$$F - F_a = m \cdot 0$$

$$F - F_a = 0$$

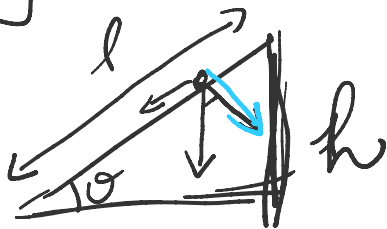
$$F = F_a = \mu N = \mu \cdot mg$$

$$\approx 0,3 \cdot 20 \cdot 10 = 60 \text{ N}$$

$$3 \cdot 10^{-1} \cdot 20 \cdot 10$$

$$3 \cdot 0,1 \cdot 20 \cdot 10$$

235



$$l = 2 \text{ m}$$

$$h = 1 \text{ m}$$

$$\theta = 30^\circ$$

$$h = l \sin \theta$$

$$\frac{h}{l} = \sin \theta$$

$$a = ?$$

$$F_{p//} = m a$$

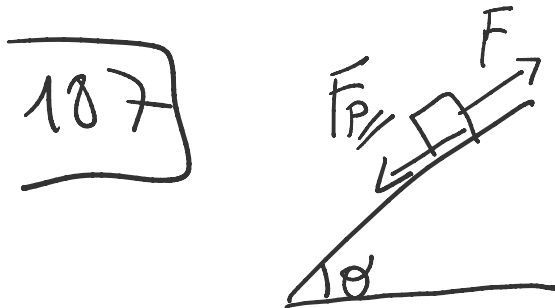
$$F_{p//} = F_p \cdot \sin \theta$$

$$F_p \cdot \sin \theta = m a$$

$$m g \sin \theta = m a$$

$$a = g \sin \theta$$

$$= \frac{1}{2} g \approx 5 \frac{m}{s^2}$$



$$m = 10 \text{ Kg}$$

$$\theta = 30^\circ$$

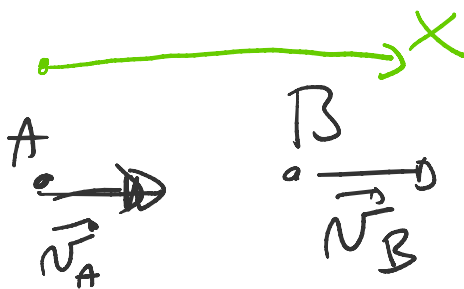
$$F_{p//} = F_p \sin \theta = m \cdot g \cdot \sin \theta = 10 \cdot 10 \cdot \frac{1}{2} = 50 \text{ N}$$

$$F = 50 \text{ N} \quad \Sigma F_{//} = m a_{//}$$

$$F_{p//} - F = m \cancel{a_{//}} \quad \text{X}$$

$$F = F_{p//} = 50 \text{ N}$$

112



$$v_A = 90 \frac{\text{Km}}{\text{h}}$$

$$v_B = 60 \frac{\text{Km}}{\text{h}}$$

$$x_{0A} = 0 \text{ m}$$

$$x_{0B} = 20 \text{ Km}$$

$$x = x_0 + v t$$

$$\begin{cases} x_A = x_{0A} + v_A \cdot t = 0 + 90 \cdot t \\ x_B = x_{0B} + v_B \cdot t = 20 + 60 t \end{cases}$$

$$\begin{cases} x_A = x_{0A} + v_A \cdot t = 0 + 90 \cdot t \\ x_B = x_{0B} + v_B \cdot t = 20 + 60 t \end{cases}$$

$$x_4 = x_B$$

$$90t = 20 + 60t$$

$$90t - 60t = 20$$

$$\frac{30}{30}t = \frac{20}{30} \Rightarrow t = \frac{20}{30} \cdot \overset{2}{\cancel{60}} \text{ min} = 40 \text{ min}$$