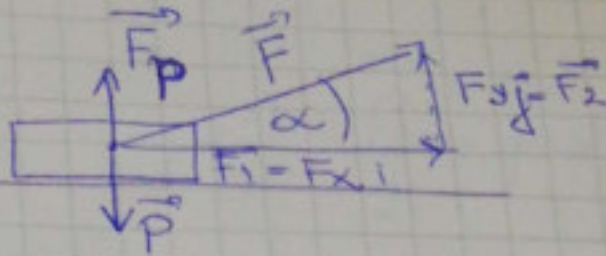


$\text{cup } 80 / \text{up } 1 \text{ m} = 20 \text{ kg}$
 $t = 3 \text{ s}$

$F = 50 \text{ N}$

$\alpha = 37^\circ$

$\cos 37 = 0,8$



$A = F \Delta x \cdot \cos d$

g) $A = ?$

$\vec{F} + \vec{F}_p + \vec{P} = m \cdot \vec{a}$

a) $S = \Delta x = ?$

x: $F_x = m \cdot a$

$F \cos d = m \cdot a$

$a = \frac{F \cdot \cos d}{m} = \frac{50 \cdot 0,8}{20} = \frac{4}{2} = 2 \text{ m/s}^2$

$\Delta x = S = \frac{at^2}{2}$

$\Delta x = \frac{2 \cdot 3^2}{2} = 9 \text{ m}$

g) $A = F \Delta x \cos d$

$A = 50 \cdot 9 \cdot 0,8 = 409 = 360 \text{ J}$

11
 Aufg 81 / Aufg 2.

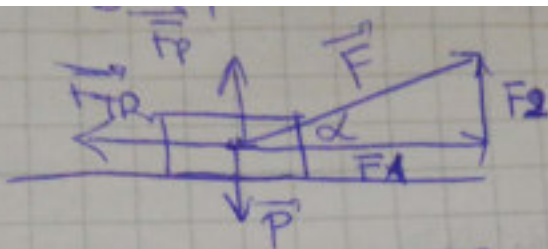
$$m = 4 \text{ kg}$$

$$a = 3 \text{ m/s}^2$$

$$F_{TR} = 5 \text{ N}$$

$$\Delta x = s = 4 \text{ m}$$

$$A = ?$$



$$\vec{F}_{TR} + \vec{F} + \vec{P} + \vec{F}_N = m \cdot \vec{a}$$

$$x: F_x - F_{TR} = m \cdot a$$

$$F \cos \alpha - F_{TR} = m \cdot a$$

$$F \cos \alpha = m \cdot a + F_{TR} = 4 \cdot 3 + 5 = 17$$

$$A = F \cdot \Delta x \cdot \cos \alpha = 17 \cdot 4 = 68 \text{ J}$$

ωр 82/ур

$$l = 3 \text{ m}$$

$$\alpha = 30^\circ$$

$$t = 1 \text{ s}$$

$$m = 200 \text{ kg}$$

$$\eta = 80\% = 0,8$$

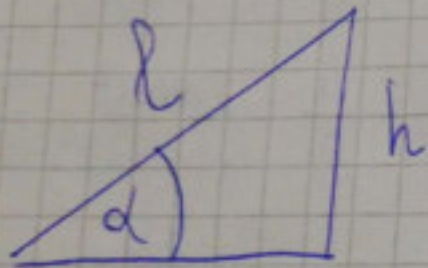
$P_{\text{вложено}} = ?$

$$P_{\text{кор}} = \frac{A}{t} = \frac{E_p}{t}$$

$$P_{\text{кор}} = \frac{mgh}{t}$$

$$P_{\text{кор}} = \frac{mgl \sin \alpha}{t}$$

$$\eta = \frac{P_{\text{кор}}}{P_{\text{влож}}}$$



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

$$h = l \cdot \sin \alpha$$

$$P_{\text{влож}} = \frac{P_{\text{кор}}}{\eta} = \frac{mgl \sin \alpha}{t \cdot \eta}$$

$$P_{\text{влож}} = \frac{200 \cdot 10 \cdot 3 \cdot 0,5}{1 \cdot 0,8} = \frac{3000}{0,8} = \frac{30000}{8}$$

$$P_{\text{влож}} = 3460 \text{ W} = 3,46 \text{ kW}$$

awp 83/4 DOM.

$$t = 10 \cdot 60 = 600 \text{ s} = 6 \cdot 10^2 \text{ s}$$

$$A = F_{TR} \Delta S$$

$$m = 3 \cdot 10^6 \text{ kg}$$

$$A = \int m g \cdot \Delta S$$

$$v = 72 \text{ km/h} = 20 \text{ m/s}$$

$$A = \int m g v t$$

$$\mu = 0,005$$

$$A = 0,005 \cdot 10 \cdot 3 \cdot 10^6 \cdot 20 \cdot 6 \cdot 10^2$$

$$A = 5 \cdot 10^{-3} \cdot 60 \cdot 10^9$$

$$A = 30 \cdot 10^7 \text{ J}$$

$$A = 300 \cdot 10^6 \text{ J} = 300 \text{ MJ}$$

wp 84/2

$$v_1 = 10 \text{ m/s}$$

$$v_2 = 20 \text{ m/s}$$

$$v = 1200 \text{ m/s}$$

$$A = ?$$

$$A = \Delta E_k$$

$$A = \frac{m(v_2^2 - v_1^2)}{2}$$

$$A = \frac{1200}{2} (400 - 100)$$

$$A = 600 \cdot 300$$

$$A = 180000 \text{ J}$$

$$A = 18 \cdot 10^4 \text{ J}$$

$$A = 180 \cdot 10^3 \text{ J} = 180 \text{ kJ}$$

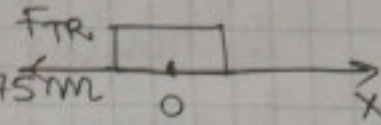
③ $m = 2 \text{ kg}$

$$\Delta x = 75 \text{ cm} = 0,75 \text{ m}$$

$$\mu = 0,8$$

$$E_{k1} = 16 \text{ J}$$

$$E_{k2} = ?$$



$$A = \Delta E_k$$

$$A = -F_{TR} x$$

$$\Delta E_k = \frac{mv_2^2}{2} - \frac{mv_1^2}{2}$$

$$-F_{TR} x = \Delta E_k$$

$$-\int \mu mg \Delta x = \left(\frac{mv_2^2}{2} \right) - \frac{mv_1^2}{2}$$

$$-2 \int \mu mg \Delta x = mv_2^2 - mv_1^2$$

$$-\int \mu mg \Delta x = E_{k2} - E_{k1}$$

$$E_{k1} - \int \mu mg \Delta x = E_{k2}$$

$$16 - 0,8 \cdot 2 \cdot 10 \cdot 0,75 = E_{k2}$$

$$E_{k2} = 16 - 12 = 4 \text{ J}$$

авр 88/③

$$m = 3t = 3 \cdot 10^3 \text{ kg}$$

$$h = 100 \text{ km} = 100 \cdot 10^3 = 10^5 \text{ m}$$

$$\Delta E_p = ? \quad E_p = mgh$$

$$E_p = 3 \cdot 10^3 \cdot 10 \cdot 10^5$$

$$E_p = 3 \cdot 10^9 \text{ J} = 3 \text{ GJ}$$

88/④

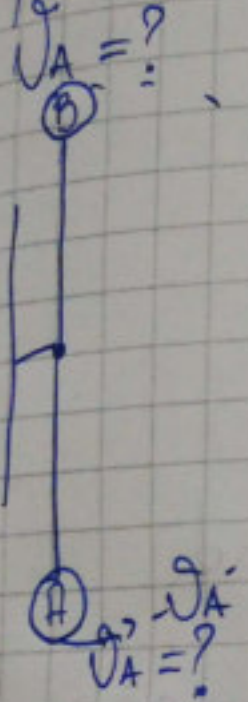
$$6P_M = P_Z \quad h_M = h_Z$$

$$\frac{E_{pM}}{E_{pZ}} = ? \quad \frac{E_{pM}}{E_{pZ}} = \frac{P_M \cdot h}{P_Z \cdot h} = \frac{P_M}{6P_M} = \frac{1}{6}$$

$$\frac{E_{pM}}{E_{pZ}} = \frac{1}{6}$$

НА МЕСЕЧНА
6 ПАТИ СЕ НАМАЛУВА

cup 8g / up. 1



$$E_A = E_B$$

$$E_{KA} + E_{PA} = E_{KB} + E_{PB}$$

$$\frac{mv_A^2}{2} = \frac{mv_B^2}{2} + mgl \cdot 2$$

$$a_m = g$$

$$v_A^2 = v_B^2 + 2 \cdot gl \cdot 2$$

$$a_m = \frac{v_B^2}{R} = g \Rightarrow \frac{v_B^2}{l} = g$$

$$v_B^2 = gl$$

$$v_B^2 = gl$$

$$v_A^2 = gl + 4gl$$

$$v_A = \sqrt{5gl}$$

up 90/3
 $v_0 = 30 \text{ m/s}$
 $h_{\text{max}} = ?$

$$E_k = E_p$$
$$\frac{m v_0^2}{2} = mgh$$

$$h = \frac{v_0^2}{2g} = \frac{900}{2 \cdot 10} = 45 \text{ m}$$

up 90/
④ $h = 10 \text{ m}$
 $v = ?$

$$v = \sqrt{2gh}$$

$$v = \sqrt{2 \cdot 10 \cdot 10}$$

$$v = 14 \text{ m/s}$$

aufg 90 / ⑤

$$m = 100 \text{ kg}$$

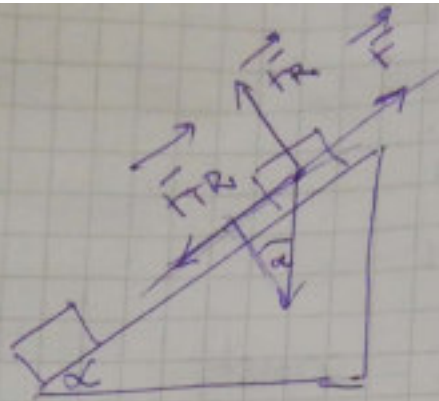
$$l = 2 \text{ m}$$

$$\alpha = 30^\circ$$

$$\mu = 0,1$$

$$a = 1 \text{ m/s}^2$$

A = ?



$$\sin \alpha = \frac{P_x}{P}$$

$$\cos \alpha = \frac{P_y}{P}$$

$$\vec{F} + \vec{F}_{TR} + \vec{F}_R + \vec{P} = m \cdot \vec{a}$$

$$x: F - F_{TR} - P_x = m \cdot a$$

$$y: F_R - P_y = 0$$

$$F_R = P_y$$

$$F = m \cdot a + P_x + F_{TR}$$

$$F = 100 \cdot 1 + P \cdot \sin \alpha + \mu \cdot F_R$$

$$F = m \cdot a + m \cdot g \cdot \sin \alpha + \mu \cdot m \cdot g \cdot \cos \alpha$$

$$F = 100 \cdot 1 + 100 \cdot 10 \cdot 0,5 + 0,1 \cdot 100 \cdot 10 \cdot 0,866$$

$$F = 100 + 500 + 86,6$$

$$F = 686,6 \text{ N}$$

$$A = F \cdot l = 686,6 \cdot 2 = 1373,2 \text{ J} \quad \left(\begin{array}{l} g = 9,81 \text{ m/s}^2 \\ 1359,8 \text{ J} \end{array} \right)$$