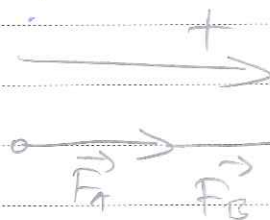


1.) $m = 8 \text{ kg}$
 $a_1 = 0,50 \text{ m/s}^2$ $\vec{F}_A \rightarrow \vec{F}_B \rightarrow$ istoč
 $a_2 = 0,40 \text{ m/s}^2$ $\vec{F}_A \rightarrow$ istoč, $\vec{F}_B \leftarrow$ zapad

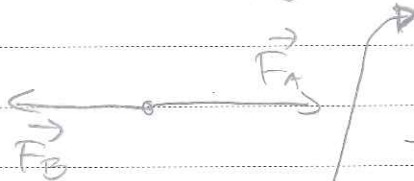
$F_A, F_B = ?$

a)



$F_A + F_B = m \cdot a_1$

b)



$F_A - F_B = m \cdot a_2$

$a_1 = \frac{F_A + F_B}{m} / \cdot m$

$a_2 = \frac{F_A - F_B}{m} / \cdot m$

$2F_A = m(a_1 + a_2) / : 2$

$F_A = \frac{1}{2} m(a_1 + a_2)$

$F_A = \frac{1}{2} \cdot 8 \cdot (0,50 + 0,40)$

$F_A = 3,60 \text{ N}$

$F_A + F_B = m \cdot a_1$

$F_B = m \cdot a_1 - F_A$
 $= 8 \cdot 0,50 - 3,6$
 $= 0,40 \text{ N}$

$$2] \quad m_H = 7,35 \cdot 10^{22} \text{ kg}$$

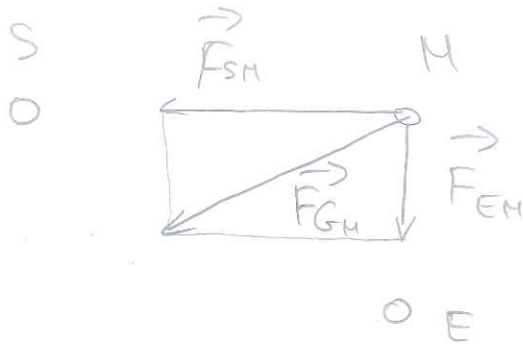
$$m_E = 5,98 \cdot 10^{24} \text{ kg}$$

$$m_S = 1,99 \cdot 10^{30} \text{ kg}$$

$$r_{SH} = 1,50 \cdot 10^{11} \text{ m}$$

$$r_{EH} = 3,85 \cdot 10^8 \text{ m}$$

$$F_{GH} = ?$$



$$F_{GH} = \sqrt{F_{SH}^2 + F_{EH}^2}$$

$$F_{SH} = G \cdot \frac{m_S \cdot m_H}{r_{SH}^2} = 4,34 \cdot 10^{20} \text{ N}$$

$$F_{EH} = G \cdot \frac{m_E \cdot m_H}{r_{EH}^2} = 1,98 \cdot 10^{20} \text{ N}$$

$$F_{GH} = 4,77 \cdot 10^{20} \text{ N} //$$

$$3.) m_E = 5450 \text{ kg}$$

$$G_A = 3620 \text{ N} + G_B \Rightarrow G_A - G_B = 3620 \text{ N}$$

$$r_A = r_B = 1,33 \cdot 10^{-7} \text{ m}$$

$$M_A - M_B = ?$$

$$F_G = G \cdot \frac{m_E \cdot m_p}{r_p^2}$$

$$\left. \begin{array}{l} G_A = G \cdot \frac{m_E \cdot m_A}{r_A^2} \\ G_B = G \cdot \frac{m_E \cdot m_B}{r_B^2} \end{array} \right\} G_A - G_B = G \cdot \frac{m_E m_A}{r^2} - G \cdot \frac{m_E m_B}{r^2}$$

$$G_A - G_B = 3620 = G \cdot \frac{m_E}{r^2} (m_A - m_B) \quad \bigg/ \cdot \frac{r^2}{G \cdot m_E}$$

$$m_A - m_B = (G_A - G_B) \cdot \frac{r^2}{G \cdot m_E}$$

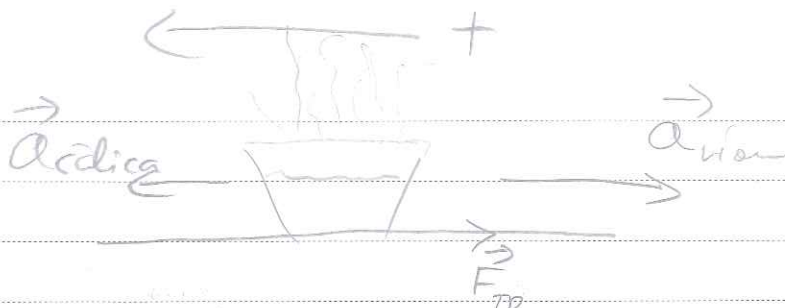
$$= 3620 \cdot \frac{(1,33 \cdot 10^{-7})^2}{6,67 \cdot 10^{-11} \cdot 5450}$$

$$m_A - m_B = 1,76 \cdot 10^{-24} \text{ kg} //$$

③



5.) $\mu = 0,30$
 $a = ?$



$$\sum F = 0 \Rightarrow m \cdot a_{\text{salica}} - F_{\text{tr}} = 0 \Rightarrow m a_s = F_{\text{tr}}$$

$$\mu a = \mu g$$

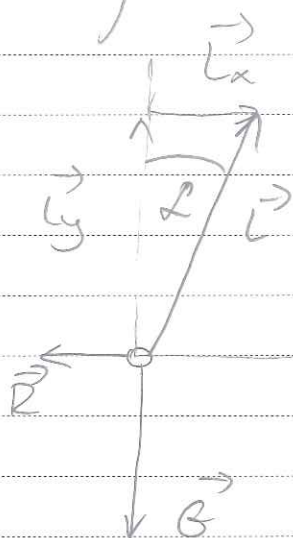
$$a = \mu \cdot g = 2,943 \text{ m/s}^2 = 2,9 \text{ m/s}^2$$

$\sum F = 0$ per salica uinje

6.) $G = 53800 \text{ N}$
 $L = 21,0^\circ$

a) $L = ?$

b) $R = ?$



$\sum F = 0$ (giba se, jednoliko)

PO OSIMA:

x: $L_x - R = 0$

$L \sin L - R = 0$

y: $L_y - G = 0$

$L \cos L - G = 0$

$L \sin L = R$

$L \cos L = G$

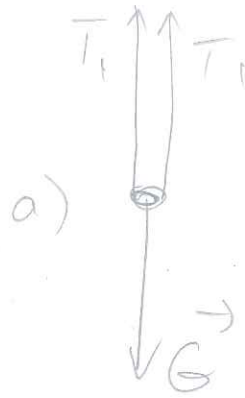
$L = 20600 \text{ N}$

$L = \frac{G}{\cos L} = \underline{\underline{52600 \text{ N}}}$

(4)



7. $T_1 = 92,0 \text{ N}$
 ~~T_2~~ = ?

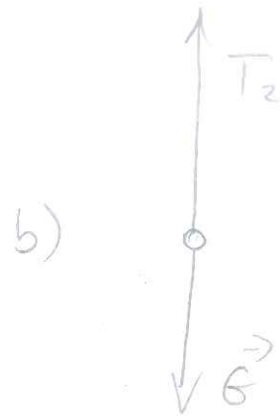


a) $\sum F = 0$

$$T_1 + T_1 - G = 0$$

$$T_1 + T_1 = G$$

$$G = \underline{\underline{184 \text{ N}}}$$



b) $v = \text{const.} \Rightarrow a = 0$

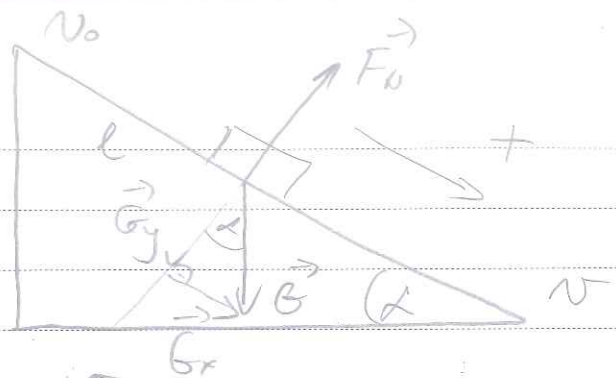
$$\sum F = 0$$

$$T_2 - G = 0$$

$$T_2 = G = \underline{\underline{184 \text{ N}}}$$

⑤

9.) $l = 6\text{ m}$
 $\alpha = 18^\circ$
 $v_0 = 2,6\text{ m/s}$



$v = ?$

$$v^2 = v_0^2 + 2as$$

$$\sum F = m \cdot a$$

$$G_x = m \cdot a$$

$$G \cdot \sin \alpha = m \cdot a$$

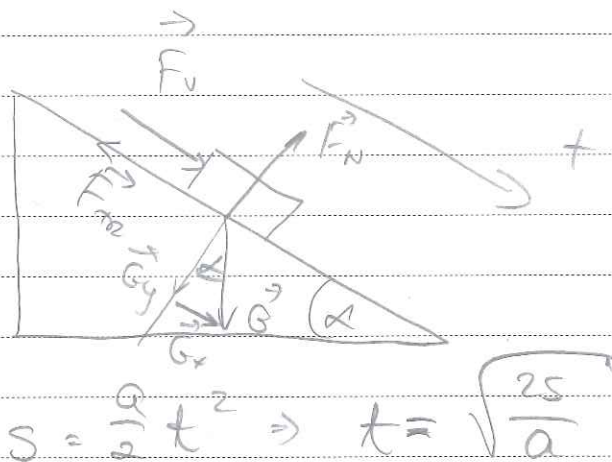
$$v = \sqrt{v_0^2 + 2a \cdot l}$$

$$\mu g \sin \alpha = a$$

$$a = g \cdot \sin \alpha = 3,03\text{ m/s}^2$$

$$v = \sqrt{v_0^2 + 2 \cdot l \cdot g \cdot \sin \alpha} = \underline{\underline{6,6\text{ m/s}}}$$

10.) $\alpha = 30^\circ$
 $F_v = 105\text{ N}$
 $m = 65,0\text{ kg}$
 $\mu = 0,150$
 $s = 17,5\text{ m}$
 $v_0 = 0$
 $t = ?$



$$s = \frac{a}{2} t^2 \Rightarrow t = \sqrt{\frac{2s}{a}}$$

$$\sum F = m \cdot a \quad (x\text{-os})$$

$$t = \underline{\underline{8,17\text{ s}}}$$

$$G_x + F_v - F_{\text{fr}} = m \cdot a$$

$$G \cdot \sin \alpha + F_v - \mu G \cos \alpha = m \cdot a$$

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

$$a = \frac{(g \sin \alpha + \mu g \cos \alpha) m + F_v}{m}$$



$$11. r_A = 120 \text{ m}$$

$$r_B = 240 \text{ m}$$

$$a_{cpA} = a_{cpB}$$

$$\frac{v_A}{v_B} = ?$$

$$a_{cp} = \frac{v^2}{r}$$

$$a_{cpA} = a_{cpB}$$

$$\frac{v_A^2}{r_A} = \frac{v_B^2}{r_B}$$

$$\frac{v_A^2}{v_B^2} = \frac{r_A}{r_B}$$

$$\frac{v_A}{v_B} = \sqrt{\frac{r_A}{r_B}} = \sqrt{\frac{120}{240}} = \sqrt{\frac{1}{2}} = 0,71$$

$$12.) d = 5 \text{ cm} = 0,05 \text{ m} \Rightarrow r = 0,025 \text{ m}$$

$$v = 0,32 \text{ m/s}$$

$$a_{cp} = ?$$

$$a_{cp} = \frac{v^2}{r} = \frac{(0,32 \text{ m/s})^2}{0,025} = 4,1 \text{ m/s}^2$$

13.] $a_{cp} = 6,25 \cdot 10^3 \times g$
 $r = 5 \text{ cm} = 0,05 \text{ m}$

$f [1/\text{min}] = ?$

$\omega = \frac{v}{r} = \frac{2\pi}{T}$

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

$a_{cp} = \frac{v^2}{r} \Rightarrow v = \sqrt{a_{cp} \cdot r} = 55,3 \text{ m/s}$

$T = 5,68 \cdot 10^{-3} \text{ s} = 9,42 \cdot 10^{-5} \text{ min}$

$f = \frac{1}{T} = \frac{1}{9,42 \cdot 10^{-5}} = \underline{\underline{10600 \text{ ob/min}}}$

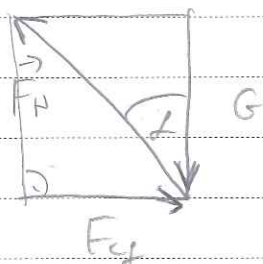
14.] $r_1 = 112 \text{ m}$

$r_2 = 165 \text{ m}$

$h = 1 \text{ km}$

$x = 53 \text{ m}$

$v_1, v_2 = ?$



$\tan L = \frac{h}{x} = 0,34$

$\tan L = \frac{F_{cf}}{v_2} = \frac{\frac{mv^2}{r}}{v_2}$

$\tan L = \frac{v_1}{gr} \Rightarrow v = \sqrt{\tan L \cdot g \cdot r}$

$v_1 = \sqrt{\tan L \cdot g \cdot r_1} = \underline{\underline{19 \text{ m/s}}}$

$v_2 = \sqrt{\tan L \cdot g \cdot r_2} = \underline{\underline{23 \text{ m/s}}}$

8



$$16. \quad m_2 = 589 \cdot 10^{24} \text{ kg} \\ T = 1,20 \cdot 10^4 \text{ s}$$

$$\omega = \frac{v}{r} = \frac{2\pi}{T} \Rightarrow T = \frac{2\pi r}{v}$$

$$v = ?$$

$$F_G = F_{cp}$$

$$G \cdot \frac{m_s \cdot m_2}{r^2} = \frac{m_s \cdot v^2}{r}$$

$$v^2 = G \cdot \frac{m_2}{r}$$

$$r = \frac{G \cdot m_2}{v^2}$$

$$T = \frac{2\pi}{v} \cdot \frac{G \cdot m_2}{v^2} = \frac{2\pi G \cdot m_2}{v^3}$$

$$v^3 = \frac{2\pi G \cdot m_2}{T} \quad \bigg| \sqrt[3]{}$$

$$v = \sqrt[3]{\frac{2\pi \cdot G \cdot m_2}{T}} = \underline{\underline{5903,1 \text{ m/s}}}$$

$$r_p = 4,15 \cdot 10^6 \text{ m}$$

$$17. \quad m_s = 5850 \text{ kg}$$

$$a = 4,1 \cdot 10^5 \text{ m}$$

$$T = 24 = 7200 \text{ s}$$

$$G = ?$$

na površini

$$F_G = G \cdot \frac{m_s \cdot M_p}{r^2}$$

$$r = r_p + a = 4,56 \cdot 10^6 \text{ m}$$

$$(*) F_G = G \cdot \frac{m_s \cdot M_p}{r^2}$$

$$F_G = F_{cp} \quad \text{ i } \quad T = \frac{2\pi}{\omega} \Rightarrow M_p = \frac{4\pi^2 r^3}{G \cdot T^2}$$

$$(*) F_G = G \cdot \frac{m_s \cdot \frac{4\pi^2 r^3}{G \cdot T^2}}{r^2} = \underline{\underline{2,45 \cdot 10^4 \text{ N}}}$$

DODATAK

(9)