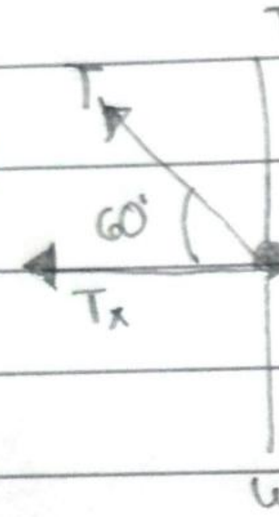
Ejercicio 1.

a)



$\Sigma F_y = 0$

$T_y - \omega = 0$

$T_y = 0$

$T \operatorname{sen}(60) = m \cdot g$

$T = \frac{mg}{\operatorname{sen}(60)} = \frac{3 \cdot 9,8}{\operatorname{sen}(60)}$

$T_x = ma_c$

$T \cos(60) = 3 \cdot a_c$

$33,95 \cdot \cos(60) = 3a_c$

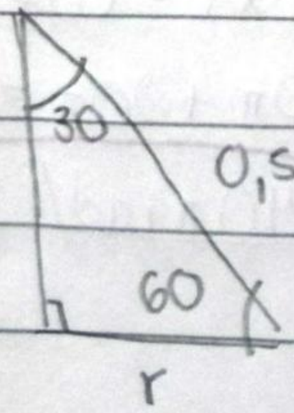
$16,98 = 3a_c$

$\frac{16,98}{3} = a_c$

b) $\boxed{T = 33,95N}$

$5,65 = a_c$

$\boxed{a_c = \frac{V_T^2}{r}}$



$\operatorname{sen} 30 = \frac{r}{0,5}$

$r = 0,5 \cdot \operatorname{sen} 30$

$r = 0,25m$

$5,65 = \frac{V_T^2}{0,25}$

$\sqrt{0,25 \cdot 5,65} = \boxed{V_T = 1,188 m/s}$

c

#2

$r = 0,35m$

$\alpha = -2 rad/s^2$

$\omega f = 0$ $\quad \omega_0 = 20\pi rad/s$

$f_0 = 600 rpm$

$\frac{600 \text{ rev}}{\text{min}} \cdot \frac{1 \text{ min}}{60 s} \cdot \frac{2\pi rad}{2 \text{ vuelta}} = 20\pi \, rad/s$

$V_T = \omega r$

$V_r = 20\pi rad \cdot 0,35 m$

$[V_r = 7\pi m/s = 21,99 m/s]$ a

$\alpha = \frac{\omega f - \omega i}{t}$

$t = \frac{\omega f - \omega i}{\alpha}$

$t = \frac{0 - 20\pi}{-2}$

$\boxed{t = 10\pi s = 31,42 s}$ b

$\alpha \cdot t = \omega f - \omega i$

$\alpha t + \omega_1 = \omega f$

$2 \cdot 10\pi + 20\pi = \omega f$

$\boxed{40\pi rad/s = \omega f}$ d

$\theta = \frac{\omega f^2 - \omega i^2}{2\alpha}$

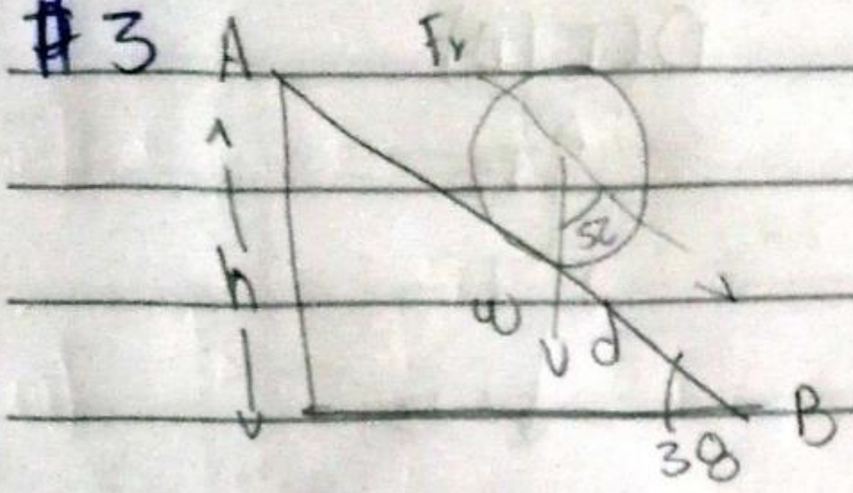
$\theta = \frac{0^2 - (20\pi)^2}{2 \cdot -2}$

$\theta = 986,96 rad$

$986,96 \text{ rad} \cdot \frac{1 \text{ rev}}{2\pi \text{ rad}} = 157,07$

$\boxed{\theta = 157 \text{ revoluciones}}$ c

#3



a

$I = \frac{2MR^2}{3}$

$E_{pA} = mgh$

$E_{pA} = mgd\,sen(38)$

$Emb = E_{CT} + E_{CR}$

↑ Tras ↑ rot

$Mgd\,sen38 = \frac{1}{2}mv_B^2 + \frac{1}{2}I\omega^2$

$Mgd\,sen38 = \frac{1}{2}mv_B^2 + \frac{1}{2}\cdot\frac{2}{3}mr^2\cdot\left(\frac{v_B}{r}\right)^2$

$gd\,sen38 = \frac{1}{2}v^2 + \frac{1}{3}v^2$

$gd\,sen38 = 5/6\,v^2$

$v^2 = 2ad$

$gd\,sen38 = 5/6\,(2ad)$

$g\,sen(38) = 5/6 \cdot 2a$

$\frac{3}{6}\,g\,Sen38 = a$

$\frac{3\,g\,sen38}{5\cdot 2} = a = \frac{3\cdot 9{,}8\,sen(38)}{5}$

$a = 3{,}62\,m/s^2$ b

$\Sigma F_y = 0$

$N - \omega_y = 0$

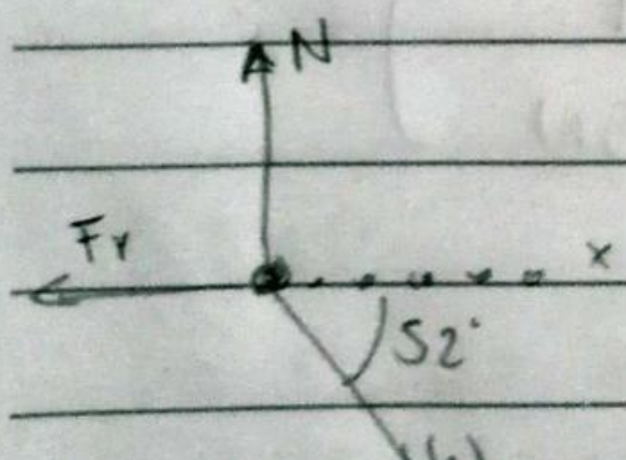
$N = \omega_y$

$N = Mg\,sen(52)$

$N = 2\cdot 9{,}8\cdot sen(52)$

$N = 15{,}45\,N$

=> Para que no resbale



$\Sigma F_x = ma$

$\omega x - Fr = ma$

$mg\cos(52) - ma = Fr$

$2\cdot 9{,}8\cos(52) - 2\cdot 3{,}62 = Fr$

$Fr = 4{,}8\,mN$ c

$\Sigma F_x = 0$

$Fr - \omega x = 0$

$Fr = \omega x$

$Fr = \cos(52)$

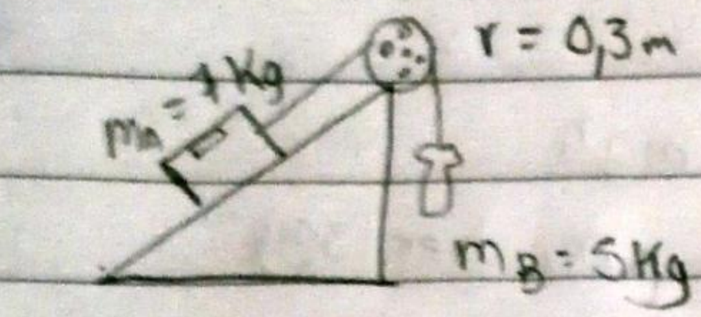
$Fr = 12{,}06\,N$

$fr = \mu N$

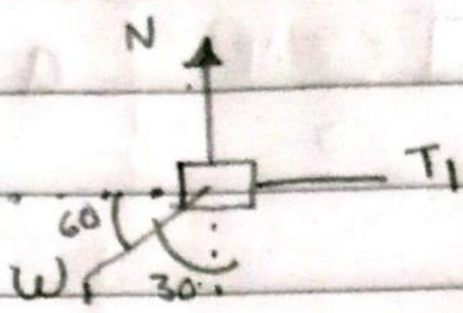
$\mu = Fr/N = \frac{12{,}06}{15{,}45}$

$\mu = 0{,}78$ d

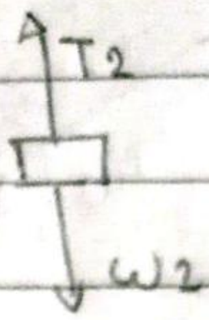
#4



a) DCL (A)



DCL (B)



En A

$\sum F_x = ma$

$W_x - T_1 = ma$

$W \operatorname{sen} 30 - T_1 = ma$

$7 \cdot 9{,}8 \cdot \operatorname{sen} 30 - T_1 = 7a$

$34{,}3 - T_1 = 7a$

$34{,}3 - 7a = T_1$

En B

$\sum F_y = ma$

$T_2 - W_2 = ma$

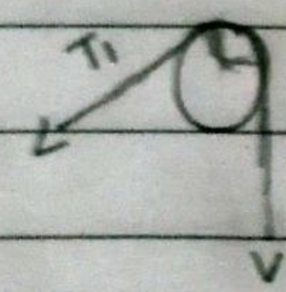
$T_2 = ma + W_2$

$T_2 = 5 \cdot a + 5 \cdot 9{,}8$

$T_2 = 5a + 49$

= Para la Polea

$\sum \tau = I\alpha$



$T_1 = 0{,}3 \cdot T_1 \operatorname{sen}(90)^1$

$+ T_1 = 10{,}29 - 2{,}1a$

$T_2 = 0{,}3 T_2 \operatorname{sen} 90^1$

$- T_2 = -(1{,}5a + 14{,}7)$

$T_2 = -1{,}5a - 14{,}7$

$\Rightarrow \sum \tau = I\left(\frac{a_T}{r}\right)$

$T_1 = 34{,}3 - 7a$

$T_1 = 41{,}65N$

$T_2 = 5a + 49$

$T_2 = 43{,}75N$

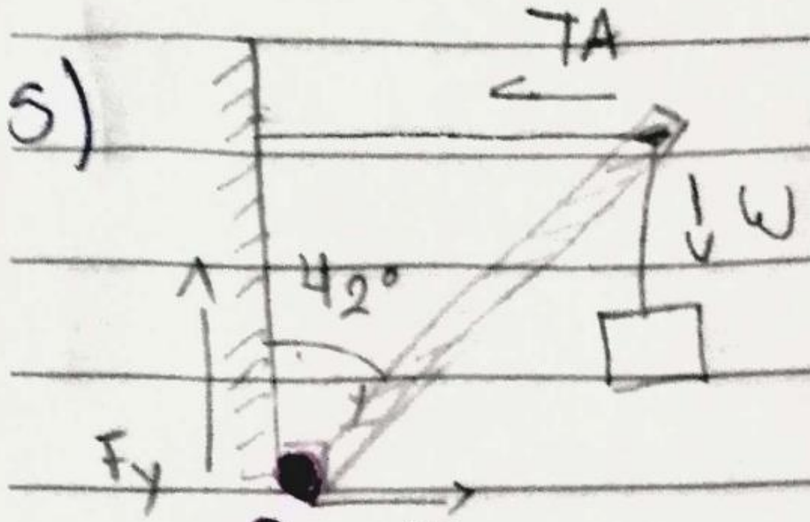
C

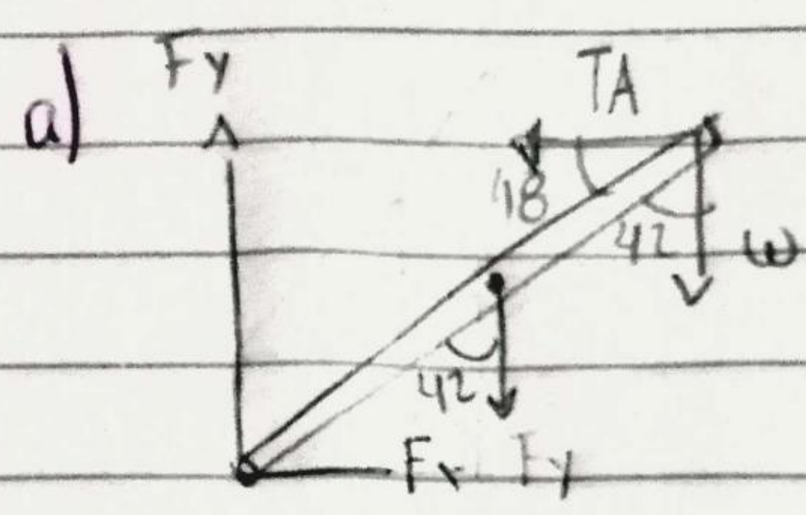
$10{,}29 - 2{,}1a - 1{,}5a - 14{,}7 = \frac{m r^2}{2}\left(\frac{a}{r}\right)$

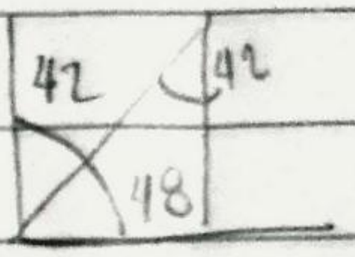
$-3{,}6a - 4{,}41 = 0{,}6a$

$-4{,}41 = 4{,}2a \Rightarrow \boxed{a = -1{,}05 m/s^2}$ b

va hacia la derecha







$W_{viga} = 15 \cdot 9,8$

$W_{viga} = 147\ N$

$l = 2,5m$

$w = 50kg \cdot 9,8$

$w = 490\ N$

* Ponemo el pivote en P

$\Sigma T = 0$ por equilibrio

$T_{TA} = r T_A \operatorname{sen}(48)$

$+ T_{TA} = 25 \cdot TA \cdot \operatorname{sen}(48)$

$+ T_{TA} = +1,86\ TA$ a

$T_w = r W \operatorname{sen} 42$

$- T_w = 2,5 \cdot 490 \cdot \operatorname{sen}(42)$

$- T_w = -819,68\ Nm$

$T_{wv} = r W_v \operatorname{sen}(42)$

$- T_{wv} = -2,5 \cdot 147 \cdot \operatorname{sen}(42)$

$- T_{wv} = -122,95\ Nm$

$\Sigma T = 0$

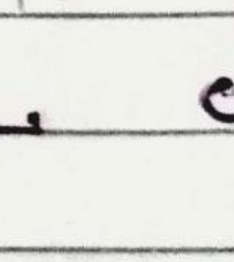
$T_{TA} + T_w + T_{wv} = 0$

$1,86\ TA - 819,68 - 122,95 = 0$

$1,86\ TA = 942,63$

$\boxed{TA = 506,79\ N}$ b

a)



\# En P

$\Sigma F_y = 0$

$F_y - W - W_v = 0$

$F_y = W + W_v$

$F_y = 490 + 147$

$F_y = 637\ N$ c

$\Sigma F_x = 0$

$F_x - TA = 0$

$F_x = TA$

$F_x = 506,79\ N$