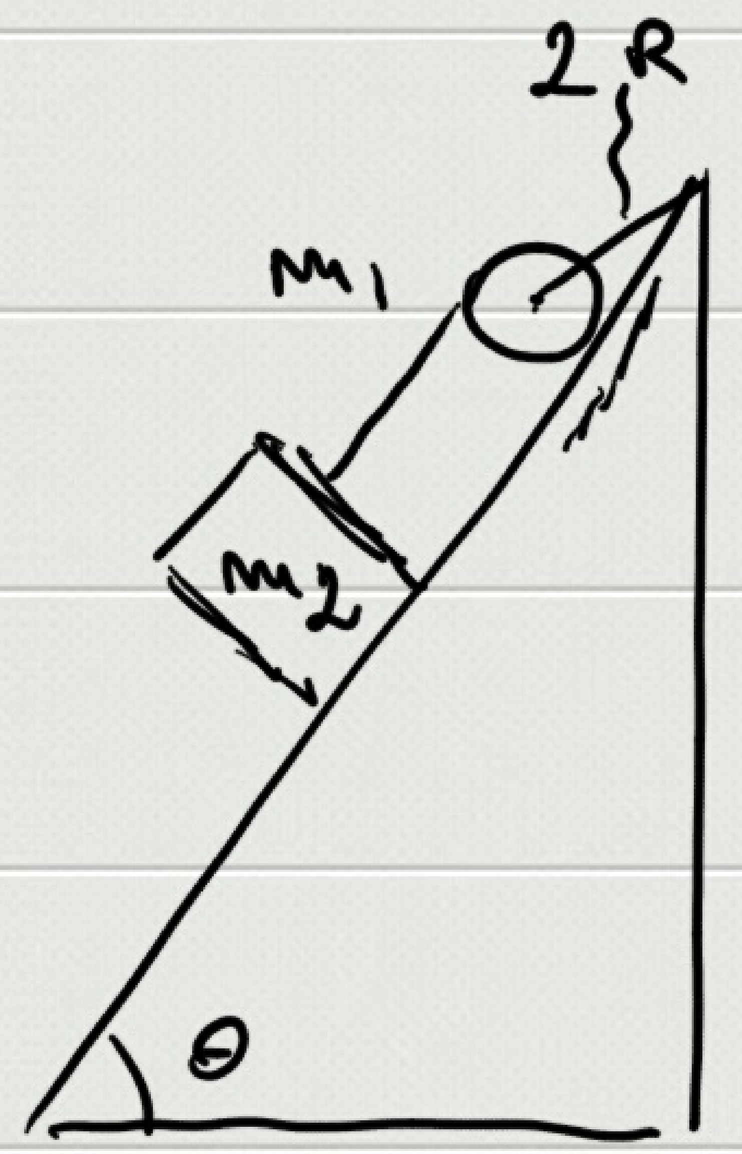


$\theta = 60^\circ$

$m_1 = 0.5\ kg$

$m_2 = 0.5\ kg$

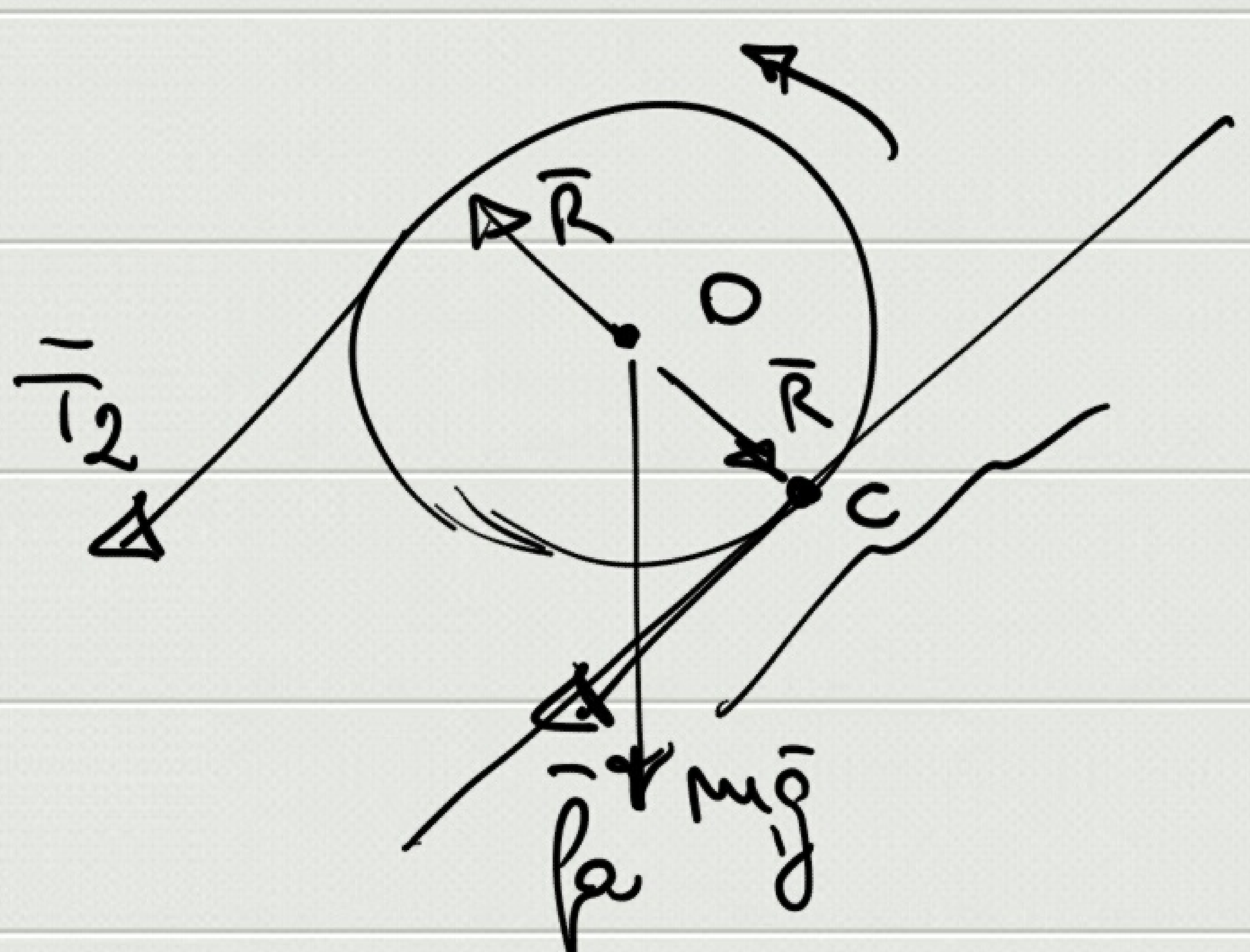
$f_a = 2\ N$

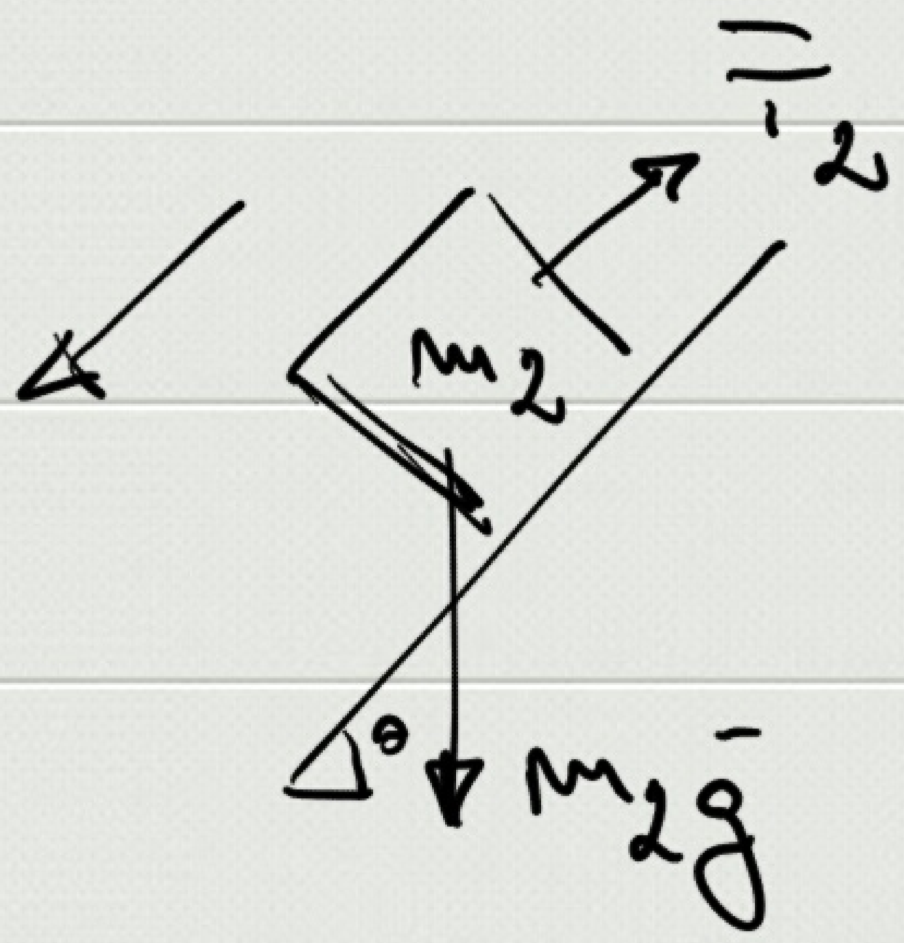
$a_2\ ,\ T_2$

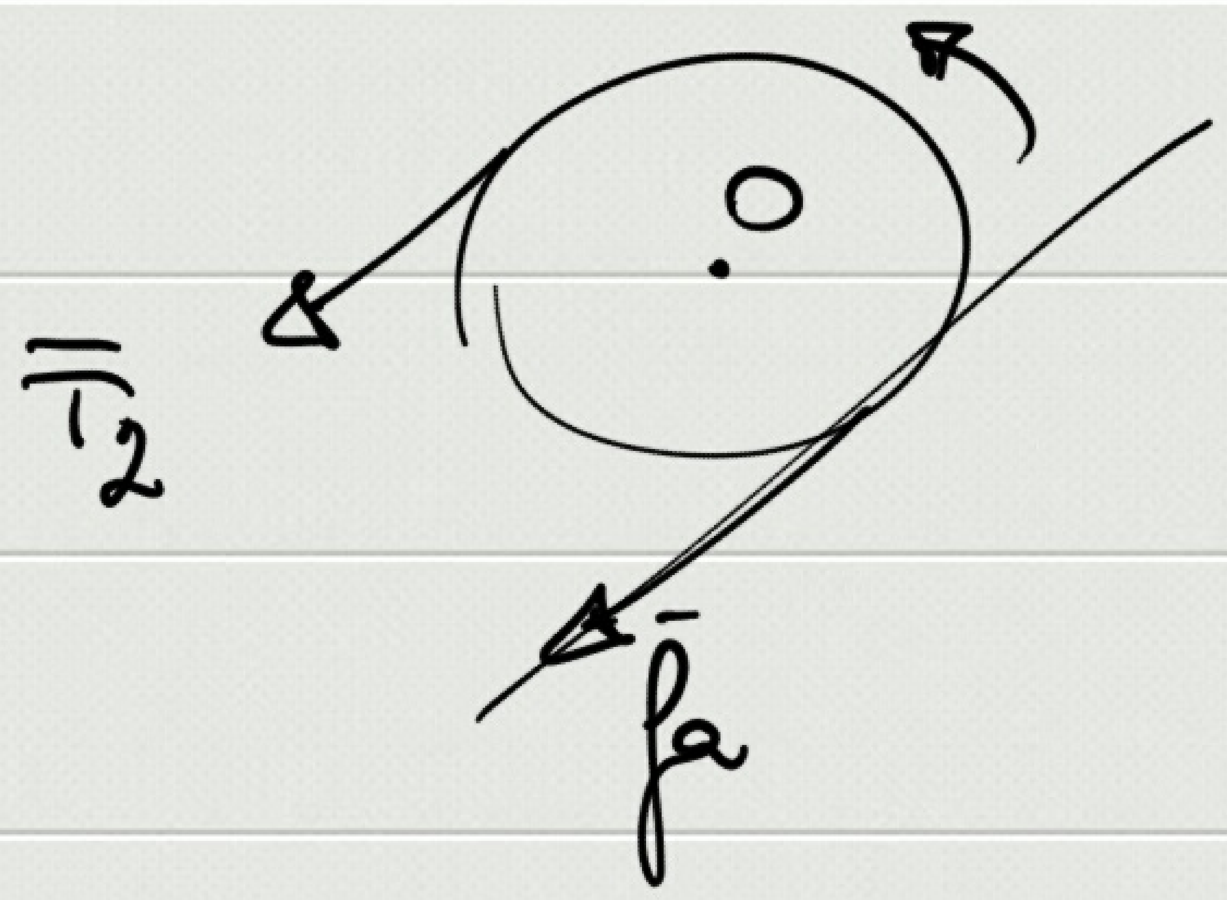
$$* \quad \boxed{R T_2 - R f_a = \frac{1}{2} m_1 R^2 \alpha}$$

$$2 R T_2 = \left(\cancel{\frac{1}{2} m_1 R^2} + m_1 R^2 \right) \alpha$$

$$\overline{M}^{e}_{polo} = I_z \alpha$$





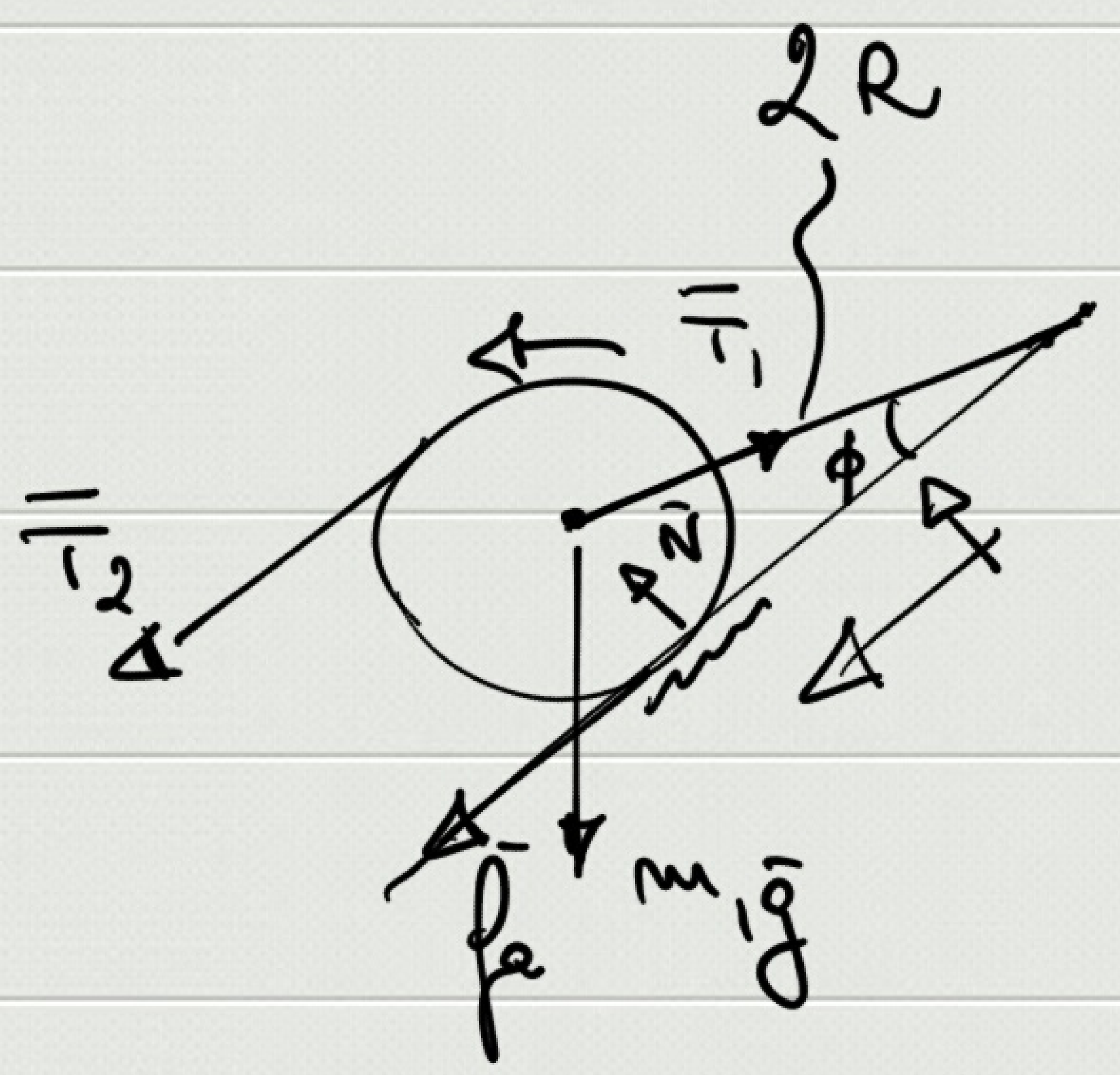


$$\begin{cases} m_2 g \sin\theta - T_2 = m_2 a_2 \\ \cancel{R} T_2 - \cancel{R} f_a = \frac{1}{2} m_1 R^2 \alpha = \frac{1}{2} m_1 R^{\cancel{2}} \frac{a_2}{\cancel{R}} \\ a_2 = a_T = \alpha R \end{cases}$$

$$m_2 g \sin\theta - f_a = \left(m_2 + \frac{1}{2} m_1\right) a_2$$

$$\Rightarrow \quad a_2 = \frac{2\left(m_2 g \sin\theta - f_a\right)}{2m_2 + m_1} = 3 \ m/s^2$$

$$T_2 = f_a + \frac{1}{2} m_1 a_2 = 2.75 \ N$$

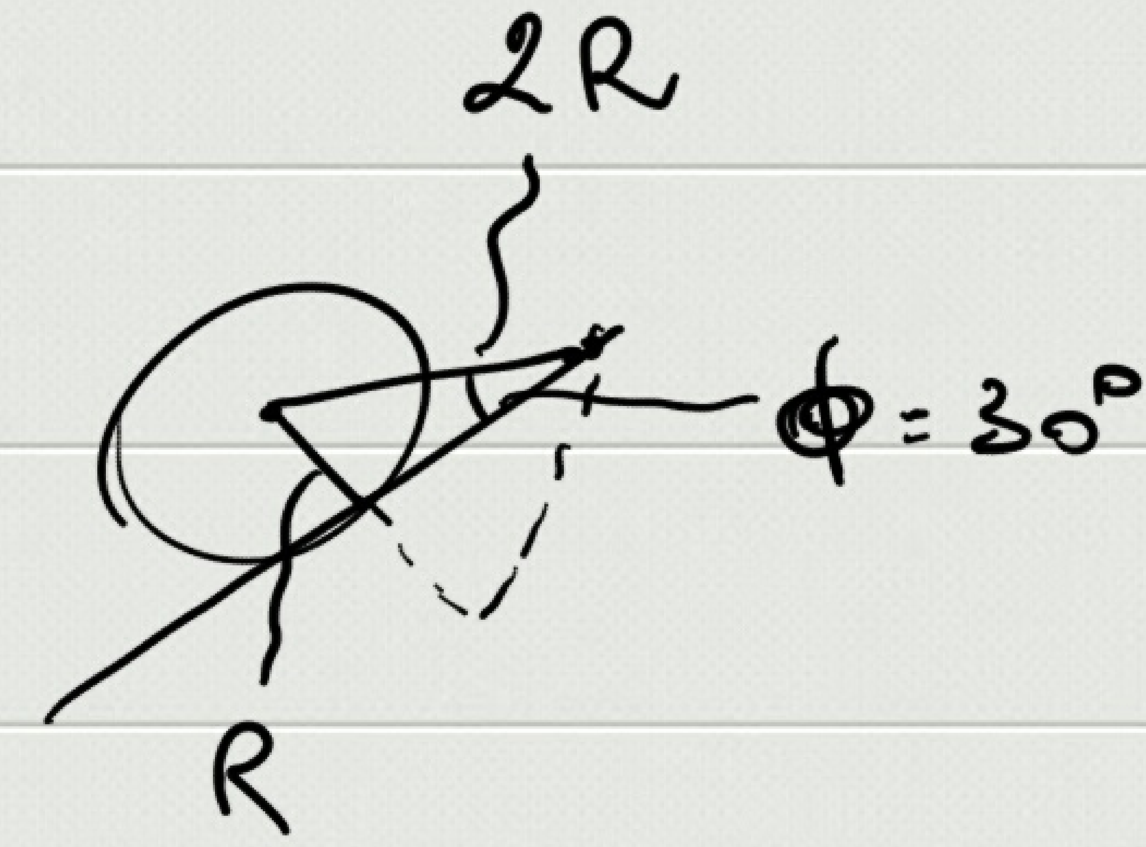


$T_1 = ?$

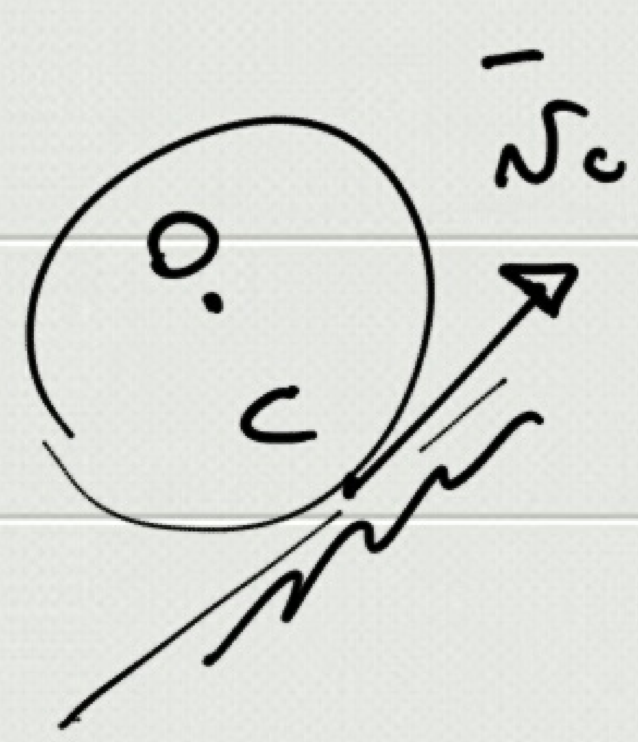
$$\bar{R}^{\varepsilon} = m_1 \bar{a}_{cm} = 0$$

$$\boxed{\bar{T}_2 + \bar{f}_a + m_1\bar{g} + \bar{N} + \bar{T}_1 = 0}$$

$$\Rightarrow \quad T_2 + f_a + m_1 g \sin\theta - T_1 \cos\phi = 0$$



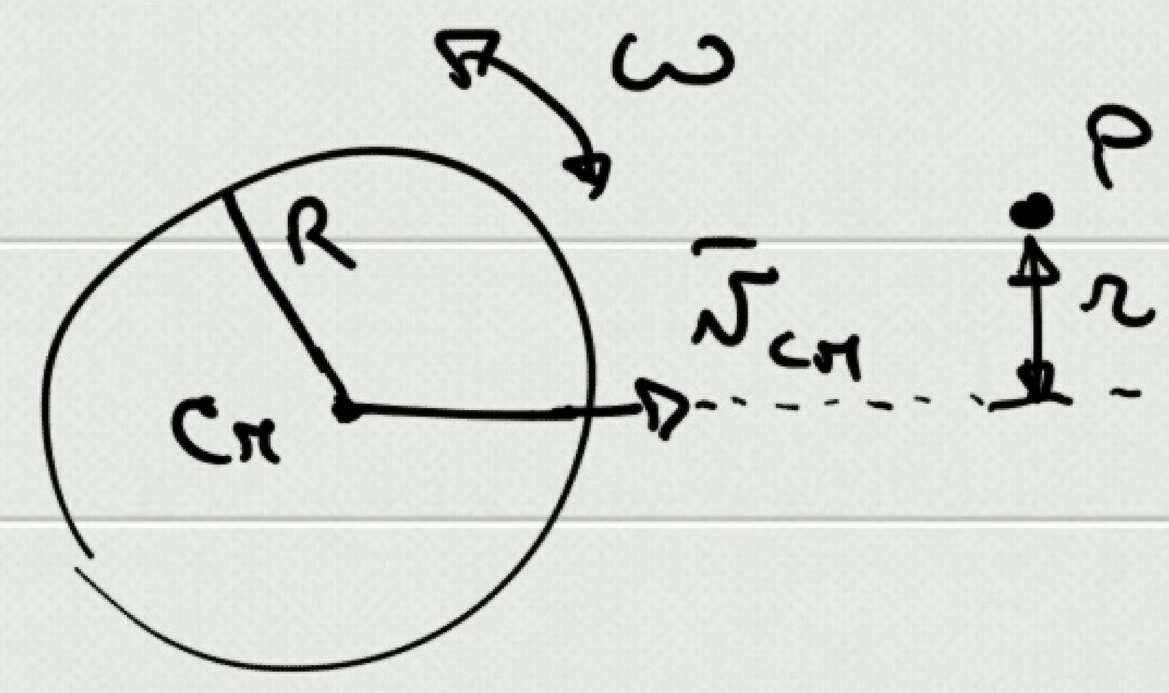
$$\Rightarrow T_1 = \frac{1}{\cos\phi}\left(T_2 + f_a + m_1 g \sin\theta\right) = 10.4 \text{ N}$$



$$f_a = \mu N \Rightarrow \mu = \frac{f_a}{N}$$

$$-m_1 g \cos\theta + N - T_1 \sin\phi = 0$$

$$\Rightarrow N = m_1 g \cos\theta + T_1 \sin\phi \qquad \Rightarrow \mu = \frac{f_a}{N} = 0.26$$



$R = 0.22 \, m$

$v_{CM} = 3.6 \, m/s$

$r = 0.16 \, m$

$v' = \omega' = 0$

anello

$\bar{\omega} = ?$

$\cancel{E_k = cost \ (\text{urto elastico})}$

$\cancel{\bar{P} = cost}$

$\bar{P}(t_0^-) = m \bar{v}_{CM}$

$\bar{P}(t_0^+) = 0$

$\bar{J} = ? \qquad m = 1 \, kg$

$$\bar{J} = \Delta \bar{P} = \emptyset - m \bar{v}_{CM} = - m \bar{v}_{CM}$$

$\bar{J}$

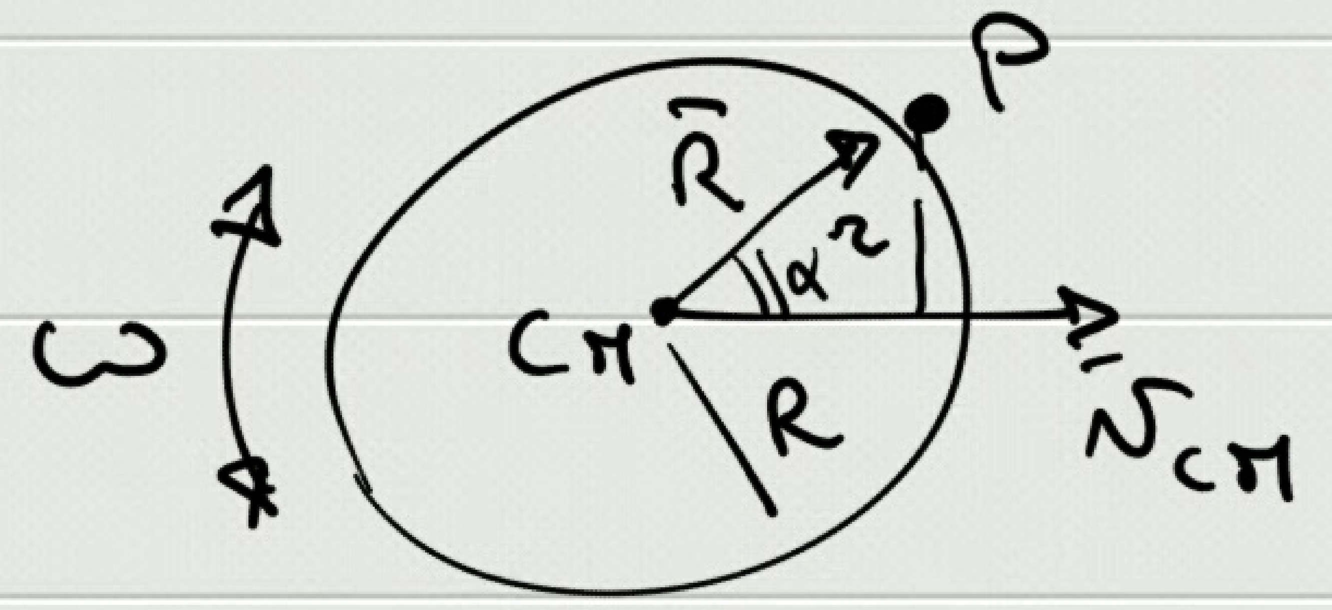
$$J = m v_{CM} = 3.6 \, Ns$$

$\bar{L}_{polo} \stackrel{?}{=} \underline{\underline{cost}}$

$\bar{L}_P = cost$

$$\stackrel{!}{=} \bar{L}_P(t_0^+) \stackrel{!}{=} 0 \quad \omega' = 0$$

$$\Rightarrow \boxed{\bar{L}_P(t_0^-) = 0}$$



$$\bar{L}_P(t_0^-) = 0$$

$$0 = mR^2\bar{\omega} + \bar{R} \times m\bar{v}_{CM} \qquad *$$

$$0 = mR^2 \cancel{\bar{\omega} + m\bar{v}_{CM}} \times \bar{R}$$

$$0 = -\cancel{m}R^2\omega + r\cancel{m}v \qquad * \qquad \otimes\,\bar{u}_z \qquad \odot\,\bar{\omega}$$

$$0 = \cancel{(mR^2 + mR^2)}\,\omega$$

$$\bar{L}_O = \underbrace{\bar{L}'_{CM}}_{I_z\bar{\omega}} + \underbrace{\bar{L}_{O,CM}}_{\bar{r}_{CM} \times m\bar{v}_{CM}}$$

$$\bar{L}_O = I_z\bar{\omega} \qquad \omega = \frac{rv}{R^2} = 11.9\ \text{rad/s}$$