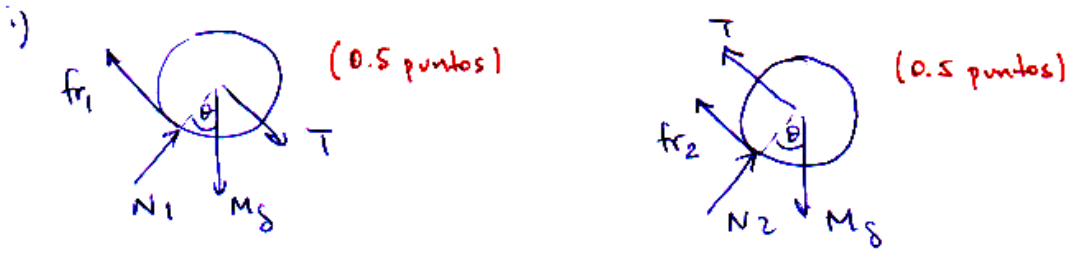
SOLUCIÓN CONTROL 3



$\sum \vec{\tau}$ c/r a puntos de contacto con el suelo

(0.5 puntos) $TR + MgR\,\text{sen}\,\theta = (I_1 + MR^2)\,\alpha$ (1)

(0.5 puntos) $-TR + MgR\,\text{sen}\,\theta = (I_2 + MR^2)\,\alpha$ (2)

$\Rightarrow$ $2MgR\,\text{sen}\,\theta = (I_1 + I_2 + 2MR^2)\,\alpha$

$$\alpha = \frac{2MgR\,\text{sen}\,\theta}{I_1 + I_2 + 2MR^2}$$ (1 pto)

reemplazando en (1) o (2)

$$T = \frac{(I_1 + MR^2)}{R}\alpha - Mg\,\text{sen}\,\theta$$

$$T = \frac{(I_1 - I_2)}{I_1 + I_2 + 2MR^2} Mg\,\text{sen}\,\theta$$ (1 pto)

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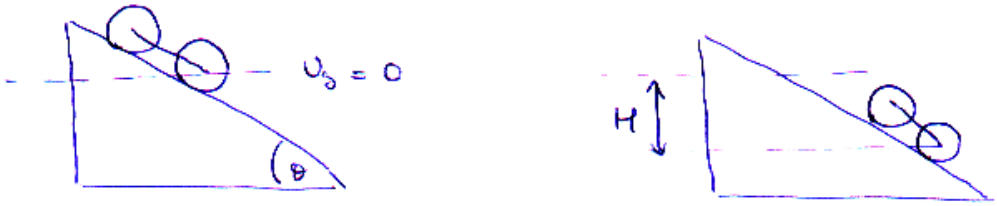
ii)



$E_i = 0$

$$E_f = -2Mg H + \frac{1}{2}Mv^2 + \frac{1}{2}Mv^2 + \frac{1}{2}I_1\omega^2 + \frac{1}{2}I\omega^2$$

(0.5 ptos)

Cons. de energía $E_i = E_f$ (0.5 ptos)

$$Mv^2 + \frac{1}{2}I_1\omega^2 + \frac{1}{2}I_2\omega^2 = 2Mg H$$

$$\left(2M + \frac{I_1}{R^2} + \frac{I_2}{R^2}\right)v^2 = \frac{4Mg H}{I_1 + I_2}$$ (0.5 ptos)

$$v = 2R\sqrt{\frac{Mg H}{2MR^2 + I_1 + I_2}}$$ (0.5 ptos)