

Rotatiekinematica

3)

$$m = 1,4 \text{ kg}$$

$$r = 0,20 \text{ m}$$

$$\alpha = \text{cte}$$

$$\omega_0 = 0 \text{ rad/s}$$

$$t = 6,0 \text{ s}$$

$$f = 1800/\text{s}$$

krachmoment:

$$\vec{\tau} = \vec{r} \times \vec{F}$$

$$\tau = I \alpha$$

$$I = m r^2 \alpha$$

$$\omega = \omega_0 + \alpha t$$

$$\frac{2\pi}{T} = \alpha \cdot 6$$

$$2\pi \cdot 1800 = \alpha = 1885 \text{ rad/s}^2 \quad \checkmark$$

$$\tau = \frac{1}{2} m r^2 \alpha$$

$$= 1,4 \cdot (0,20)^2 \cdot 1885$$

$$= 105,6 \text{ Nm}$$



4)

$$F_w = \mu F_N = \mu m g$$

$$a = \frac{F_z - F_w}{m_1}$$

$$v = v_0 + a t$$

$$0 = 0,20 + a \cdot 6,2$$

$$a = -0,032 \text{ m/s}^2$$

$$F_z = m_1 \cdot g = 38 \text{ N}$$

$$F_w = F_z - a m_1 = 38,1 \text{ N}$$

$$\tau = r \times F_w = 0,03 \cdot 38,1 = 1,14 \text{ Nm}$$

translatiemoment $m_1 = 3,80 \text{ kg}$ $m_2 = 3,40 \text{ kg}$

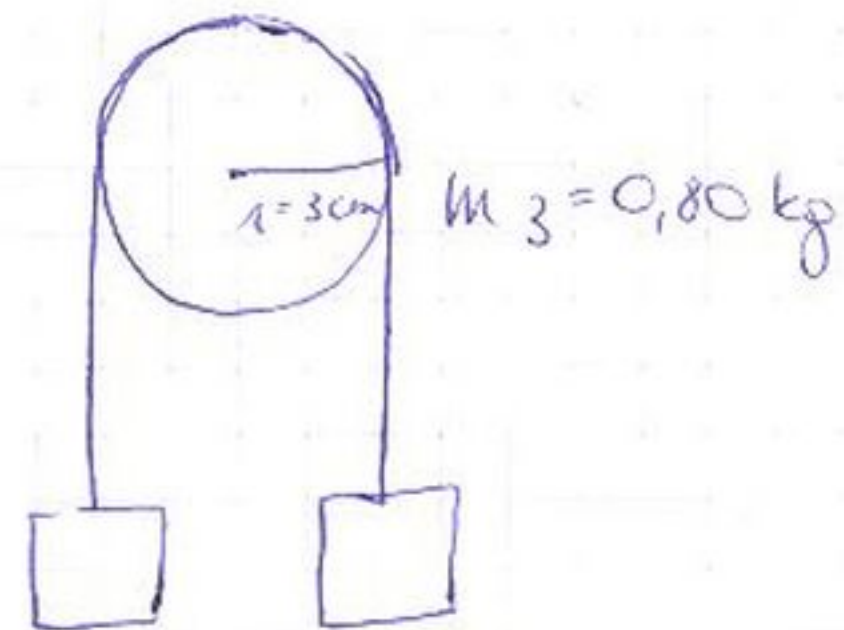
$$M = (F_{z,2} - F_{z,1}) \cdot 0,010$$

rotatie

$$\tau_{\text{rot}} = I \cdot \alpha$$

$$\omega = \frac{v}{r}$$

$$\alpha = \frac{\omega}{t} = 1,1 \text{ rad/s}^2$$



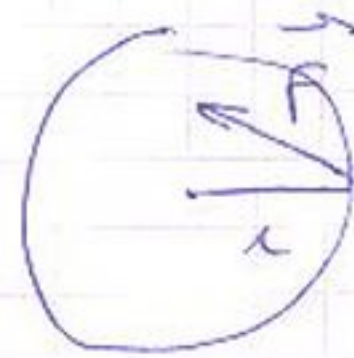
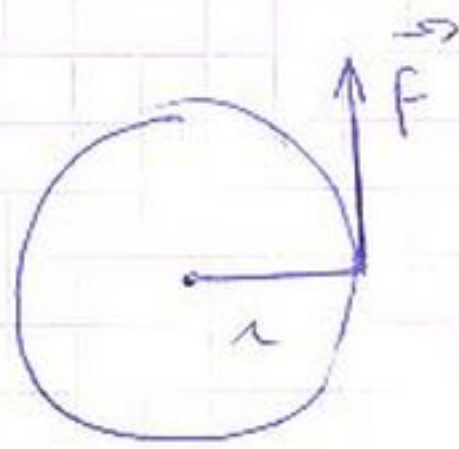
6) $F = 200 \text{ N}$
 $r = 0,25 \text{ m}$

$$\tau_1 = F \cdot r \cdot \sin 30^\circ$$

$$= 50 \text{ Nm} \quad \checkmark$$

$$\tau_2 = F \cdot r \cdot \sin 40^\circ$$

$$= 32,1 \text{ Nm} \quad \checkmark$$



7) $m = 0,500 \text{ kg}$

$$I = 0,015 \text{ kg m}^2 \quad I = m r^2$$

$$f = 30 \text{ Hz}$$

163 Omwentelingen $\rightarrow l = 163$

$$\omega = ? \quad \tau = I \cdot \alpha$$

$$\omega = 2\pi f$$

$$= 188,5 \text{ rad/s} \quad \checkmark$$

$$I = m \cdot r^2$$

$$\Rightarrow r = \sqrt{\frac{I}{m}} = \sqrt{\frac{0,015}{0,500}} = 0,17 \text{ m}$$

$$\theta = \frac{l}{r} = \frac{163}{0,17} = 958 \text{ rad} \rightarrow \text{inwendige tijd}$$

$$t = 5,43 \text{ s}$$

$$\alpha = ?$$

$$\tau = I \cdot \alpha$$

$$= 0,015 \cdot \alpha$$

$$= ?$$

$$\alpha = \frac{d\omega}{dt} = \frac{188,5}{5,43} \text{ s}^{-2}$$


$$\tau = I \cdot \alpha$$

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- 8) a) juist want ze verhoogt haar
verzet tegen versnelling ($I = m \cdot r^2$)
 r neemt toe
- b) juist want meer wrijving
- c) $I = m \cdot r^2$
 \hookrightarrow neemt toe

\rightarrow fout \checkmark

- d) ~~fout~~ juist want $L = r \cdot m v$ \hookrightarrow verandert
 $L = I \cdot \omega$ \hookrightarrow verandert

- 9) $r = 0,247 \text{ m}$ \leftarrow blijft constant $I \uparrow$ $\omega \downarrow$
- $v_0 = 15,3 \text{ m/s}$, $v = 0 \text{ m/s}$
- $x = 86 \text{ m}$
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a) $v^2 = v_0^2 + 2ax$

$0 = 15,3^2 + 2 \cdot a \cdot 86$

$a = -\frac{234,09}{172}$

$= -1,4 \text{ m/s}^2 \checkmark$

b) $\omega^2 = \omega_0^2 + 2\alpha\theta$

$\omega_0 = \frac{v_0}{r} = \frac{15,3}{0,247} = 61,9 \text{ rad/s}$

$\omega = 0 \text{ rad/s}$

$\theta = \omega_0 t + \frac{1}{2} \alpha t^2$ $\alpha = \frac{\Delta\omega}{\Delta t}$

$\Delta t = \frac{v_0}{a}$

c) $\bar{I} = 0,155 \text{ kg} \cdot \text{m}^2$

~~E_{kin}~~

$\tau = F_w \cdot r$ en $\tau = I \cdot \alpha$

~~07/06/11~~

(10) U_0 (beginsm.) R (straal)

$$U = \frac{9U_0}{7}$$

$$k = \frac{4R}{5} \rightarrow TR$$

Bewijs 1

met
belangrijke