

$$v = 72 \text{ km/h} = 20 \text{ m/s}$$

$$a = 4 \text{ m/s}^2$$

$$\Delta_0 = 100 \text{ m}$$

AUTO

MOTORNIKA

$$\Delta_1 = vt \quad 0,5b \quad \Delta_1 = \frac{1}{2} at^2$$

$$vt = \frac{1}{2} at^2$$

$$v = \frac{1}{2} at$$

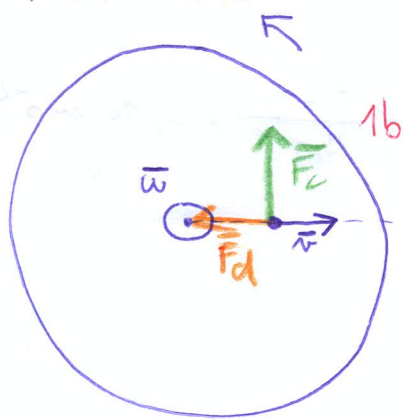
$$t = \frac{2v}{a} = \frac{2 \cdot 20}{4} = 10 \text{ s} \quad 1b$$

$$\Delta_1 = vt = 20 \cdot 10 = 200 \text{ m} \quad 1b$$

3b

②

Pohľad otca:



Pohľad na mňa: - Coriolisova sila
- odstredivá sila

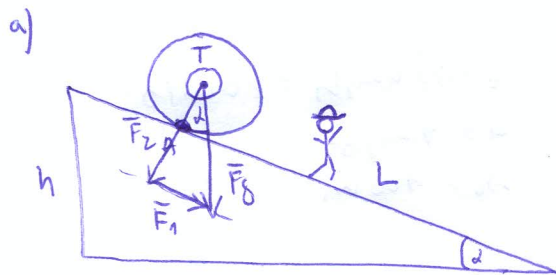
1b

$$\underline{\underline{F_c = 2m\vec{\omega} \times \vec{v}}}$$

$$\underline{\underline{F_{od} = -m\omega^2 \vec{r}}}$$

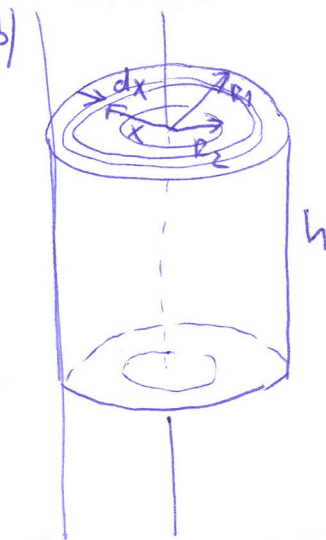
2b

3



$R_1 = 1,5 \text{ m}$
 $R_2 = 0,5 \text{ m}$
 $M = 1 \text{ t} = 1000 \text{ kg}$
 $\alpha = 20^\circ$
 $L = 500 \text{ m}$

1b



$$J_T = \int dm x^2$$

$$dm = \rho dV = \frac{M}{\pi R_1^2 h - \pi R_2^2 h} \cdot 2\pi x h dx = \frac{2M}{R_1^2 - R_2^2} x dx$$

$$J_T = \int_{R_2}^{R_1} \frac{2M}{R_1^2 - R_2^2} x dx x^2 = \frac{2M}{R_1^2 - R_2^2} \left[\frac{x^3}{3} \right]_{R_2}^{R_1} = \frac{2M}{R_1^2 - R_2^2} \frac{1}{3} (R_1^3 - R_2^3)$$

$$= \frac{1}{2} M \frac{(R_1^2 - R_2^2)(R_1^2 + R_1 R_2 + R_2^2)}{(R_1^2 - R_2^2)} = \frac{1}{2} M (R_1^2 + R_2^2)$$

$$J_A = J_T + M R_1^2 = \frac{1}{2} M (R_1^2 + R_2^2) + M R_1^2 = \frac{3}{2} M R_1^2 + \frac{1}{2} M R_2^2$$

$$J_A = \frac{3}{2} 1000 \cdot 1,5^2 + \frac{1}{2} 1000 \cdot 0,5^2 = 3500 \text{ kgm}^2 \quad 1,5b$$

g

$$\vec{M} = J_A \vec{E}$$

$$\vec{v} \times \vec{F}_1 = J_A \vec{E}$$

$$R_1 F_g \sin \alpha = \left(\frac{3}{2} M R_1^2 + \frac{1}{2} M R_2^2 \right) \frac{a}{R_1}$$

$$a = \frac{R_1^2 M g \sin \alpha}{\frac{3}{2} M R_1^2 + \frac{1}{2} M R_2^2} = \frac{R_1^2 g \sin \alpha}{\frac{3}{2} R_1^2 + \frac{1}{2} R_2^2} = \frac{1,5^2 \cdot 9,81 \sin 20^\circ}{\frac{3}{2} 1,5^2 + \frac{1}{2} 0,5^2} = \frac{7,549}{3,5} = 2,16 \text{ m/s}^2$$

$$a_{\text{ind}} \geq 2,16 \text{ m/s}^2 \quad 1b$$

d)

NIE
 ↳ plus vake ma manjši moment zadržanosti, toda ja manjša tudi elastičnost
 spotrednim na rotacijo =

$$\omega_o > \omega_o \quad 0,5b$$

e)

$$Mgh = \frac{1}{2} J_A \omega^2$$

$$Mg L \sin \alpha = \frac{1}{2} \left(\frac{3}{2} M R_1^2 + \frac{1}{2} M R_2^2 \right) \frac{\omega^2}{R_1^2}$$

$$\frac{R_1^2 M g L \sin \alpha}{\frac{3}{4} M R_1^2 + \frac{1}{4} M R_2^2} = \omega^2$$

$$\omega = \sqrt{\frac{R_1^2 g L \sin \alpha}{\frac{3}{4} R_1^2 + \frac{1}{4} R_2^2}}$$

$$\omega = \sqrt{\frac{1,5^2 \cdot 9,81 \cdot 500 \sin 20^\circ}{\frac{3}{4} 1,5^2 + \frac{1}{4} 0,5^2}} = \sqrt{\frac{3774,6}{1,75}}$$

$$\omega = 46,44 \text{ m/s} \quad 1b$$

5b