1) $\Gamma_1 = J_1 \omega_1$ (+1) $\Gamma_2 = J_2 \omega_2$ (+2) $\Gamma_1 = \Gamma_2$ (+3)

$\omega_1 = 2,5\,1/s$

$J_1 = 1,5\ kg\,m^2$

$J_2 = 1\ kg\,m^2$

$\omega_2 = \omega_1 \frac{J_1}{J_2}$ (+4) $= 3,75\,1/s$ (+5)

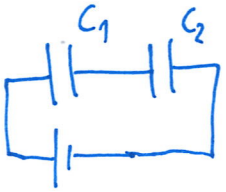
$W_1 = \frac{1}{2} J \omega_1^2$

$W_2 = \frac{1}{2} J \omega_2^2$ (+6)

deb $A = \Delta W = W_2 - W_1$ (+7)

$A = 2,34\,J$ (+8)

3) Vezava mora biti zaporedna: $\frac{1}{4}$ 1,2



Pri vzporedni vezavi bi bila napetost enaka U=24V.

$U_1 = 10V$

$U_2 = U - U_1 = 14V$

$e_1 = e_2$ (+4)

$e_1 = C_1 U_1$ (+3) $e_2 = C_2 U_2$ (+5)

$\Rightarrow C_2 = C_1 \frac{U_1}{U_2}$ (+6) $= 4,3\,nF$ (+7)

Energija: $W = \frac{C_1 U_1^2}{2} + \frac{C_2 U_2^2}{2} = 0,72\,\mu J$ (+8)

2) Najprej vlak pospešuje. $100\frac{km}{h} = 27{,}77\frac{m}{s}$ ⊕1

- če pospeši od 0 do 100 $\frac{km}{h}$:

za to porabi $t = \frac{\Delta v}{a} = \frac{100\frac{km}{h}\,s^2}{0{,}3\,m} = \frac{27{,}77\,m\,s^2}{0{,}3\,s\,m}$

$t = 92{,}6\,s$ ⊕2

v tem času prevozi

$s = \frac{at^2}{2}$ ali $s = \frac{v_{končna}}{2} \cdot t = 1285{,}6\,m$ ⊕3

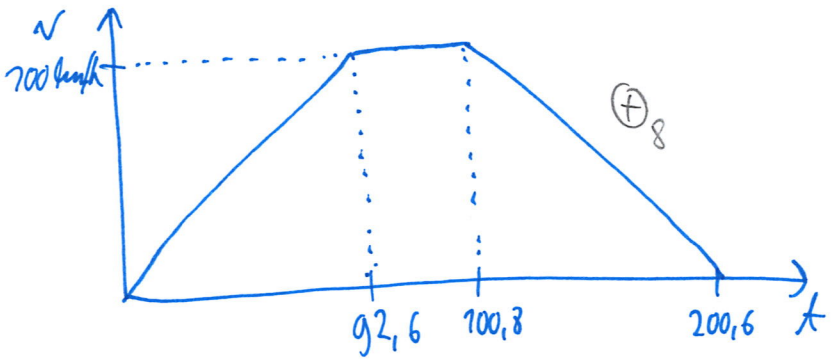
- v isti razdalji in času tudi upočasni od 100 $\frac{km}{h}$ do 0. ⊕4

Vmes ostane $3\,km - 2 \cdot 1{,}2856\,km = 428{,}7\,m = s_2$ ⊕5

proge, kjer se pelje s konstantno hitrostjo.

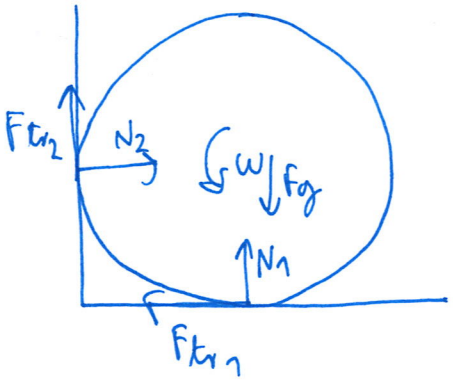
$t = \frac{s_2}{v} = 15{,}4\,s$ ⊕6

Najkrajši čas, ki ga rabi vlak, je torej $2 \cdot 92{,}6\,s + 15{,}4\,s = 200{,}6\,s$ ⊕7



⊕8

4)



$F_g = mg$

$F_{tr_2} = N_2 k_{tr} = F_{tr_1} k_{tr}$

$F_{tr_1} = N_1 k_{tr} = (mg - F_{tr_2}) k_{tr}$ ⊕1 $= (mg - F_{tr_1} k_{tr}) k_{tr}$

$F_{tr_1} (1 + k_{tr}^2) = mg\, k_{tr}$

$F_{tr_1} = \frac{mg\, k_{tr}}{1 + k_{tr}^2}$ ⊕2

$F_{tr_2} = \frac{mg\, k_{tr}^2}{1 + k_{tr}^2}$ ⊕3

$M = F_{tr_1} \cdot r + F_{tr_2} \cdot r$ ⊕4

a) $M = J \cdot \alpha$

$\alpha = \frac{M}{J} = \frac{(F_{tr_1} + F_{tr_2})\, r}{\frac{1}{2} m r^2}$

$\alpha = \frac{2}{r} \frac{m}{m} \frac{g k_{tr} (1 + k_{tr})}{1 + k_{tr}^2}$

$\alpha = 21{,}78\ 1/s^2$ ⊕5

Čas ustavljanja:

$t_0 = \frac{\omega_0}{\alpha} = 2{,}75\ s$ ⊕6

Prepotovan kot:

$\varphi = \omega_0 \cdot t_0 - \frac{\alpha t_0^2}{2}$ ali $\varphi = \frac{\omega_0}{2} \cdot t_0$

$\varphi = 82{,}64$ ⊕7

Št. obratov $N = \frac{\varphi}{2\pi} = 13{,}15$ ⊕8

← ali →

b) $A = \Delta W$ ⊕5

$M \cdot \varphi = \frac{J \omega_0^2}{2}$ ⊕6

$\varphi = \frac{\frac{1}{2} m r^2 \omega_0^2}{2 \cdot (F_{tr_1} + F_{tr_2}) \cdot r}$

$\varphi = \frac{r \omega_0^2}{4} \frac{(1 + k_{tr}^2)}{k_{tr} (1 + k_{tr})\, g}$

$\varphi = 82{,}64$ ⊕7

$N = 13{,}15$ ⊕8