5. cvičení

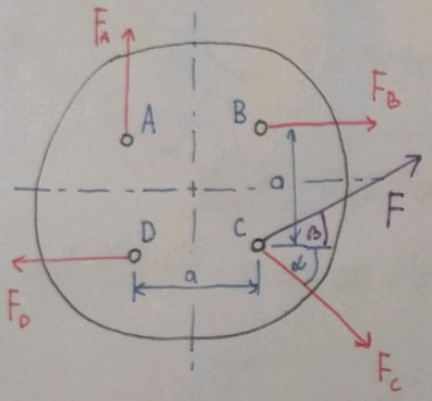
MCH*Z

Příklad 1

- kruhový disk přišroubovaný k podložce v bodě C

$F_A = 125\,N$, $F_B = 100\,N$, $F_C = 150\,N$, $F_D = 80\,N$, $a = 20\,cm$, $\alpha = 45°$

Nahraďte působení soustavy sil momentem a silou v bodě C



$$F_x = F_B + F_C \cos\alpha - F_D = 100 + 150\cos(45°) - 80 = 126\,N$$

$$F_y = F_A - F_C \sin\alpha = 125 - 150\sin(45°) = 19\,N$$

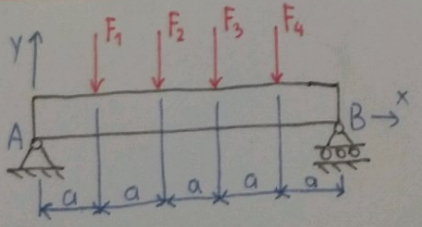
$$M = -F_A a - F_B a = -0{,}2\,(125 + 100) = \underline{45\,Nm}$$

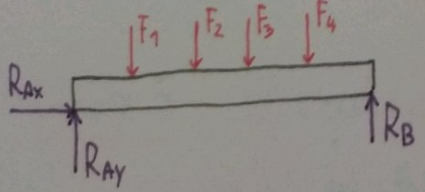
$$F = \sqrt{F_x^2 + F_y^2} = \underline{127\,N}$$

$$\beta = \operatorname{arctg}\left(\frac{F_y}{F_x}\right) = \underline{8{,}5°}$$

Příklad 2

$F_1 = 500\,N$, $F_2 = 800\,N$, $F_3 = 700\,N$, $F_4 = 400\,N$, $a = 3\,m$ U: reakce





$\rightarrow x$: $R_{Ax} = 0$

$\uparrow y$: $R_A - F_1 - F_2 - F_3 - F_4 + R_B = 0$

$\circlearrowleft A$: $-F_1 a - F_2 2a - F_3 3a - F_4 4a + R_B 5a = 0$

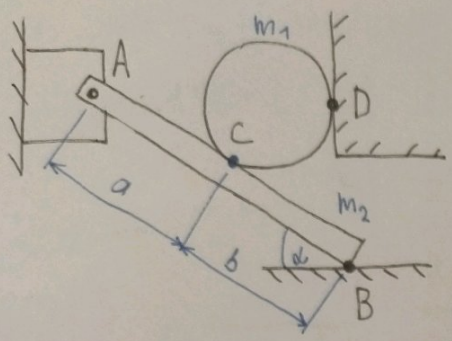
$$R_B = \frac{F_1 + 2F_2 + 3F_3 + 4F_4}{5} = \frac{1}{5}(500 + 2\cdot 800 + 3\cdot 700 + 4\cdot 400) = \underline{1160\,N}$$

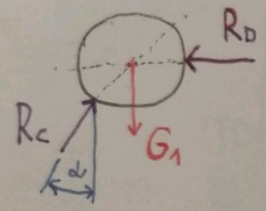
$$R_A = \sum_{i=1}^{4} F_i - R_B = \underline{1240\,N}$$

Příklad 4

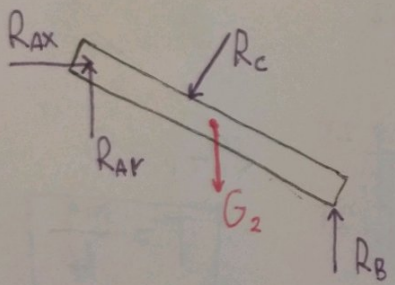
U: reakce v bodech dotyku

D: $m_1 = 100\,kg$, $m_2 = 20\,kg$, $a = 20\,cm$, $b = 30\,cm$, $\alpha = 30°$





$$\vec{x}: R_c \sin\alpha - R_D = 0$$
$$\uparrow y: R_c \cos\alpha - m_1 g = 0 \quad \Big\} \longrightarrow R_c, R_D$$
$$\circlearrowleft: 0 = 0$$

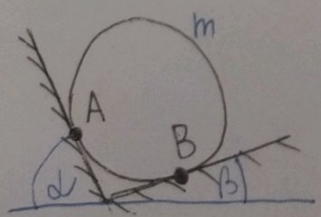


$$\vec{x}: R_{Ax} - R_c \sin\alpha = 0 \longrightarrow R_{Ax}$$
$$\uparrow y: R_{Ay} - R_c \cos\alpha - m_2 g + R_B = 0$$
$$\curvearrowleft A: -R_c a - m_2 g a \cos\alpha + R_B (a+b) \cos\alpha = 0 \quad \Big\} R_{Ay}, R_B$$

Příklad 5

U: reakce

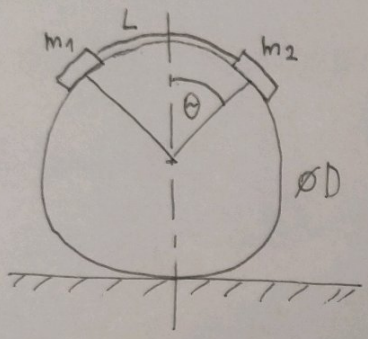
D: $m = 50\,kg$, $\alpha = 45°$, $\beta = 30°$



Příklad 6

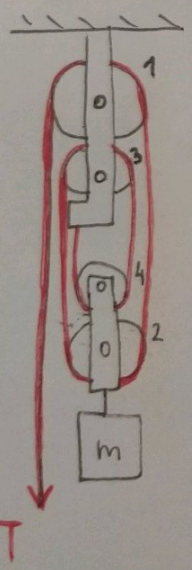
U: θ tak, aby tělesa nespadla, tah T v laně, reakce

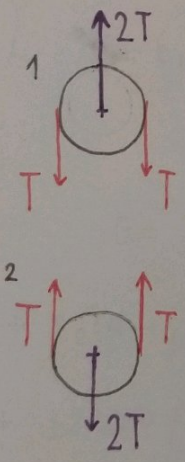
D: $m_1 = 200\ kg$, $m_2 = 150\ kg$, $D = 0{,}8\ m$, $L = 0{,}628\ m$

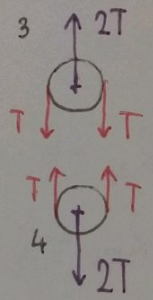


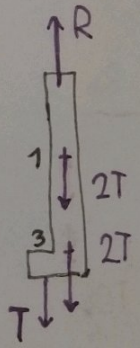
Příklad 7

U: sílu T, reakci R

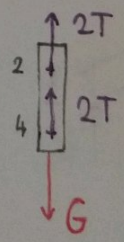








$$R = 5T = \frac{5}{4}mg$$



$$4T = G$$

$$\boxed{T = \frac{mg}{4}}$$