AKADEMIA EDUKACYJNO - INŻYNIERSKA

www.e-MECHANiK.com.pl

MATURA STUDIA PRAKTYKA STAŻ PRACA BIZNES PRZEMYSŁ STEAM

KOMPLEKSOWE WSPARCIE EDUKACYJNE **ON – LINE** NA KAŻDYM ETAPIE KSZTAŁCENIA INŻYNIERSKIEGO

email: **kontakt@e-mechanik.com.pl**
web: **www.e-MECHANiK.com.pl**
fb: www.facebook.com/groups/emechanik
tel: **(+48) - 697-165-075**

MECHANIKA II

"DYNAMIKA - UKŁAD BRYŁ SZTYWNYCH"

PROJEKT

Oblicz:

- przyspieszenie "2"
- siłę tarcia
- siłę w linie

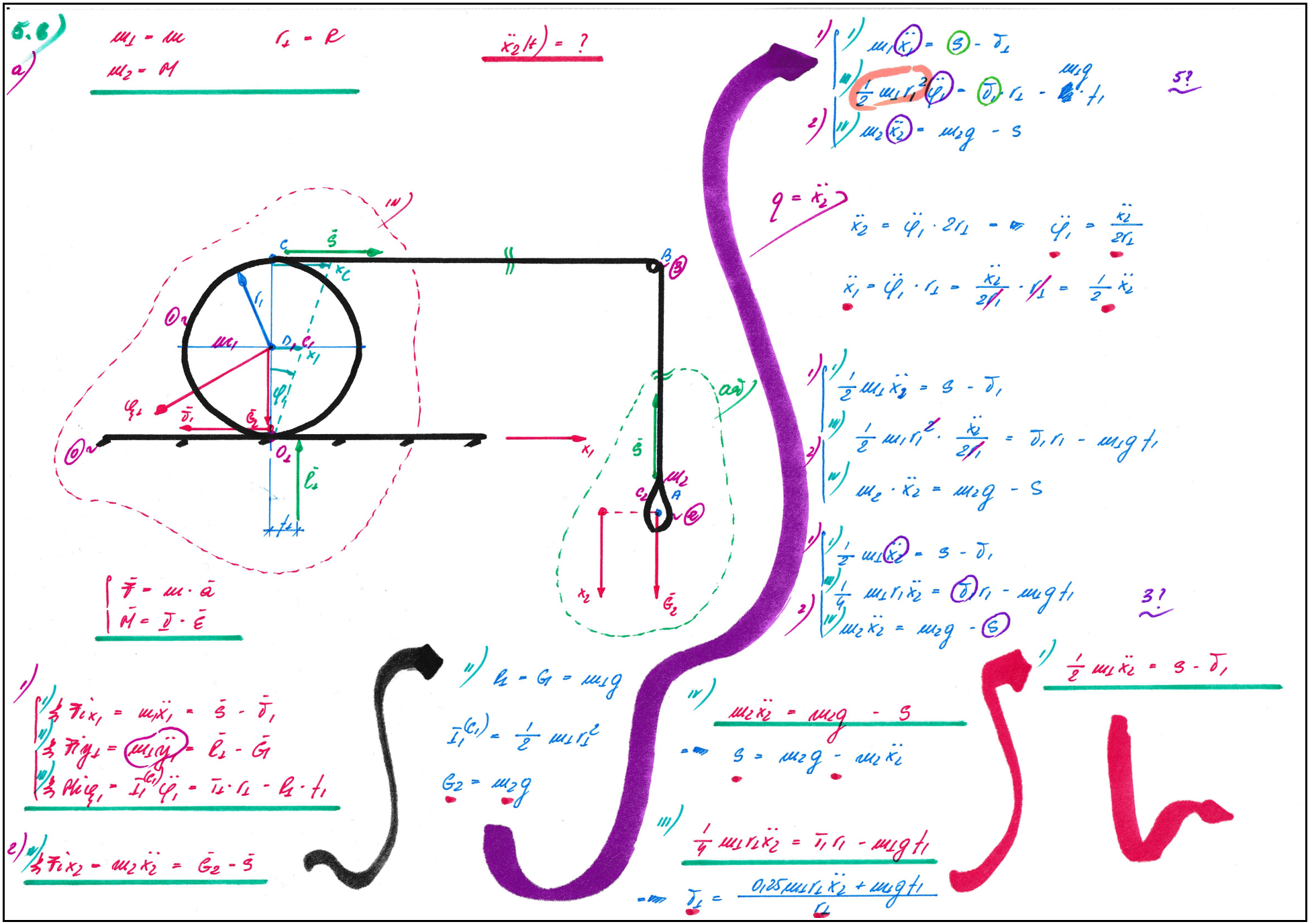
dla układu brył sztywnych.

DANE:

1) m_1, r_1 = *OK*
2) m_2 = *OK*

SZUKAM:

$x_2''(t)$ = *?*


5.6
a)
$m_1 = m$
$r_1 = R$
$m_2 = M$
$\ddot{x}_2(t) = ?$
$q = \ddot{x}_2$
$\ddot{x}_2 = \ddot{\varphi}_1 \cdot 2r_1 \Rightarrow \ddot{\varphi}_1 = \frac{\ddot{x}_2}{2r_1}$
$\ddot{x}_1 = \ddot{\varphi}_1 \cdot r_1 = \frac{\ddot{x}_2}{2r_1} \cdot r_1 = \frac{1}{2}\ddot{x}_2$
$\bar{F} = m \cdot \bar{a}$
$\bar{M} = \bar{J} \cdot \bar{\varepsilon}$
$\frac{1}{2} m_1 \ddot{x}_1 = S - T_1$
$\frac{1}{2} m_1 r_1^2 \ddot{\varphi}_1 = T_1 r_1 - m_1 g f_1$
$m_2 \ddot{x}_2 = m_2 g - S$
$\frac{1}{2} m_1 \ddot{x}_2 = S - T_1$
$\frac{1}{4} m_1 r_1 \ddot{x}_2 = T_1 r_1 - m_1 g f_1$
$m_2 \ddot{x}_2 = m_2 g - S$
5?
3?
$\sum F_{ix} = m_1 \ddot{x}_1 = \bar{S} - \bar{T}_1$
$\sum F_{iy} = m_1 \ddot{y}_1 = \bar{R}_1 - \bar{G}_1$
$\sum M_{iC_1} = I_1^{(C_1)} \ddot{\varphi}_1 = \bar{T}_1 \cdot r_1 - R_1 \cdot f_1$
$R_1 - G_1 = m_1 g$
$I_1^{(C_1)} = \frac{1}{2} m_1 r_1^2$
$G_2 = m_2 g$
$\sum F_{ix} = m_2 \ddot{x}_2 = G_2 - \bar{S}$
$m_2 \ddot{x}_2 = m_2 g - S$
$S = m_2 g - m_2 \ddot{x}_2$
$\frac{1}{4} m_1 r_1 \ddot{x}_2 = T_1 r_1 - m_1 g f_1$
$T_1 = \frac{0{,}25 m_1 r_1 \ddot{x}_2 + m_1 g f_1}{r_1}$
$\frac{1}{2} m_1 \ddot{x}_2 = S - T_1$

i) $\frac{1}{2} m_1 \ddot{x}_2 = S - T_1$

$\frac{1}{2} m_1 \ddot{x}_2 = m_2 g - m_2 \ddot{x}_2 - 0{,}25 m_1 \ddot{x}_2 - \frac{m_2 g t_1}{r_1}$

$0{,}5 m_1 \ddot{x}_2 + m_2 \ddot{x}_2 + 0{,}25 m_1 \ddot{x}_2 = m_2 g - \frac{m_2 g t_1}{r_1}$

$(0{,}45 m_1 + m_2) \ddot{x}_2 = m_2 g - \frac{m_2 g t_1}{r_1}$

$\ddot{x}_2(t) = \frac{m_2 g - \frac{m_2 g t_1}{r_1}}{0{,}45 m_1 + m_2} = \left(\frac{m_2 - \frac{m_2 t_1}{r_1}}{0{,}45 m_1 + m_2} \right) g$

iii) $T(t) = 0{,}25 m_1 \ddot{x}_2 + \frac{m_2 g t_1}{r_1}$

iv) $S(t) = m_2 g - m_2 \ddot{x}_2$


e
-mechanik
.COM
.PL