

Prvi redovni kolokvijum iz Tehničke fizike 1

1. a) $\vec{r}(t) = \frac{A}{\omega} \cdot \sin(\omega \cdot t) \cdot \vec{e}_x + \frac{A}{\omega} \cdot (1 - \cos(\omega \cdot t)) \cdot \vec{e}_y$, b) $x^2 + \left(y - \frac{A}{\omega}\right)^2 = \left(\frac{A}{\omega}\right)^2$,
 $\vec{a}(t) = -A \cdot \omega \cdot \sin(\omega \cdot t) \cdot \vec{e}_x + A \cdot \omega \cdot \cos(\omega \cdot t) \cdot \vec{e}_y$
 c) $\angle(\vec{a}, \vec{v}) = 90^\circ$, d) $v_{sr} = v = A = 5 \text{ m/s}$

2. a) $\theta = 26,56^\circ$, b) $\frac{h_{\max 1}}{h_{\max 2}} = 2,5$, c) $\frac{t_1}{t_2} = 1,05$

3. a) $a = \frac{F}{m_1 + m_2} + g \cdot \frac{m_2 \cdot \sin \alpha_2 - m_1 \cdot \sin \alpha_1}{m_1 + m_2}$, b) $F_{\max} = 163,4 \text{ N}$, c) $a_1 = 5 \text{ m/s}^2$, $a_2 = 25 \text{ m/s}^2$
 $F_z = \frac{m_1}{m_1 + m_2} \cdot F + \frac{m_1 \cdot m_2 \cdot g}{m_1 + m_2} \cdot (\sin \alpha_1 + \sin \alpha_2)$

4. a) $v_1 = v \cdot \frac{3 \cdot \cos \theta \pm \sqrt{1 - 9 \cdot \sin^2 \theta}}{2}$, b) $\theta = 19,5^\circ$, c) $\psi = 15,8^\circ$

5. a) $\frac{\rho_M}{\rho_Z} = \frac{2}{3}$, b) $\frac{g_M(H = R_M)}{g_Z(H = R_M)} = \frac{25}{384}$