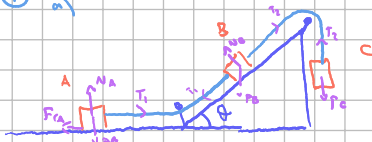


① a)



$$m_A = m_B = 20 \text{ kg}$$

$$\mu_e = 0.19$$

$$N_C = 0.15$$

$$v_C = 0.1 \text{ m/s}$$

b) $\sum F_x = m a_x$

$$T_1 - F_{RA} = m a_x = 0$$

$$-m a_y + N_A = 0 \rightarrow N_A = m a_y$$

$$F_{RA} = N_C N_A = N_C m a_y$$

$$\rightarrow T_1 = F_{RA} = N_C m a_y = \boxed{98 \text{ N}}$$

c) $T_2 - m_C g = 0 \Rightarrow m_C = \frac{T_2}{g}$

d) $T_2 - T_1 - m_B g \sin \theta - F_{RB} = 0$

$$N_B - m_B g \cos \theta = 0$$

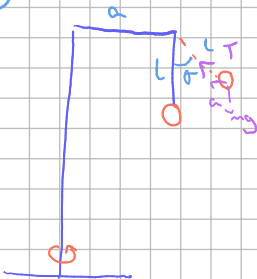
$$\rightarrow N_B = m_B g \cos \theta$$

$$F_{RB} = N_C m_B g \cos \theta$$

$$\rightarrow T_2 = T_1 + m_B g \sin \theta + N_C m_B g \cos \theta = 29.12 \text{ N}$$

$$m_C = \frac{T_2}{g} = \boxed{30 \text{ kg}}$$

②



$$m = 0.2 \text{ kg}$$

$$l = 0.1 \text{ m}$$

$$a = 0.1 \text{ m}$$

$$\theta = 45^\circ$$

$$r = a \cdot t = 0.124 \text{ m}$$

$$\sum F_x = m a_c$$

$$\text{I: } T \sin \theta = m \frac{v^2}{r} = m \omega^2 r$$

$$\text{II: } -m g + T \cos \theta = 0 \rightarrow T \cos \theta = m g$$

$$\tan \theta = \frac{\omega^2 r}{g} \rightarrow \omega = \sqrt{\frac{g}{r} \tan \theta} = \boxed{6.39 \text{ rad/s}}$$

$$T = \frac{m g}{\cos \theta} = \boxed{2.77 \text{ N}}$$

$$\omega = 2\pi f \Rightarrow \boxed{T = 0.198 \text{ s}}$$

③

$$\rho_R = 2159 \text{ kg/m}^3$$

$$\rho_{\text{air}} = 112 \text{ kg/m}^3$$

$$g_{\text{air}} = 1,8 \cdot 10^{-5} \text{ N/s/m}$$



a.) $\Sigma F = ma$
 $mg - E - F_R = ma$

$$\rho = \frac{m}{V} \rightarrow m_e = \rho_e \left(\frac{4}{3} \pi r^3 \right) = 10^{-14} \text{ kg}$$

$$m_F = \rho_F \left(\frac{4}{3} \pi r^3 \right) \approx 5 \cdot 10^{-15} \text{ kg}$$

b.) $\vec{F}_T = \vec{F}_1 + \vec{F}_2 = m a_x \vec{i} + m a_y \vec{j}$

$$\Rightarrow \sqrt{111,4^2 + 1144 \cdot 10^{-3}} \text{ N/s}$$

\hookrightarrow desprizer $\left\{ \begin{array}{l} a_x = \dots \text{ (MEVA)} \rightarrow v_x = a_x t \rightarrow x = \frac{1}{2} a_x t^2 \\ a_y = \dots \text{ (MEVA)} \rightarrow v_y = a_y t \rightarrow y = \frac{1}{2} a_y t^2 \end{array} \right.$