Λύσεις κριτηρίου 8

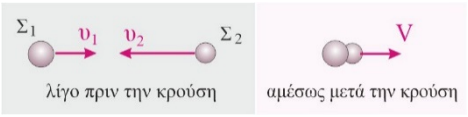
ΘΕΜΑ Α

Α1. (β) **Α2.** (β) **Α3.** (γ) **Α4.** (δ) **Α5.** α. Λ β. Σ γ. Λ δ. Σ ε. Λ

ΘΕΜΑ Β

Β1. **(i)**

$$\Delta P_1 = m_1 V - m_1 \upsilon_1 = -0,6 m_1 \upsilon_1 \Rightarrow \upsilon_1 = 2,5V$$

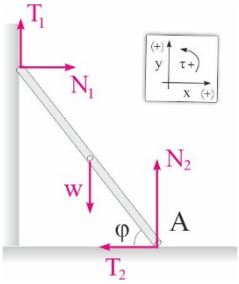


$$\text{ΑΔΟ}: m_1 \upsilon_1 - m_2 \upsilon_2 = (m_1 + m_2) V \Rightarrow \upsilon_2 = 2\upsilon_1$$

$$K_2 = \frac{1}{2} m_2 \upsilon_2^2 = \frac{1}{2} \frac{m_1}{4} (2\upsilon_1)^2 = K_1 \Rightarrow \frac{K_1}{K_2} = 1$$

Β2. **(ii)**

$$\Sigma F_x = 0 \Rightarrow N_1 = T_2 \Rightarrow N_1 = 2T_1 \Rightarrow T_1 = \frac{N_1}{2} \Rightarrow \mu_\sigma N_1 = \frac{N_1}{2} \Rightarrow \mu_\sigma = 0,5$$



$$T_2 = \mu_\sigma N_2 = 0,5 N_2 \Rightarrow N_2 = 2T_2 = 4T_1$$

$$\Sigma F_y = 0 \Rightarrow w = N_2 + T_1 = 5T_1$$

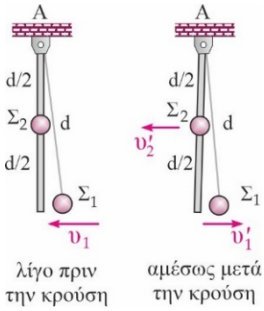
$$\Sigma \tau_{(A)} = 0 \Rightarrow w \frac{L}{2} \sigma\upsilon\nu\varphi = N_1 L \eta\mu\varphi + T_1 L \sigma\upsilon\nu\varphi \Rightarrow$$

$$\frac{5T_1}{2} \sigma\upsilon\nu\varphi = 2T_1 \eta\mu\varphi + T_1 \sigma\upsilon\nu\varphi \Rightarrow \varepsilon\varphi\varphi = 0,75$$

Β3. **(iii)**

$$\text{ΑΔΜΕ}: m_1 g d = \frac{1}{2} m_1 \upsilon_1^2 \Rightarrow \upsilon_1 = \sqrt{2gd}$$

$$\text{ΑΔΜΕ}: \frac{1}{2} m_1 \upsilon_1^2 = \quad _1 \Rightarrow \upsilon_1 = \sqrt{\quad} = \frac{\sqrt{2gd}}{2} \Rightarrow \upsilon_1 = \frac{\upsilon_1}{2}$$



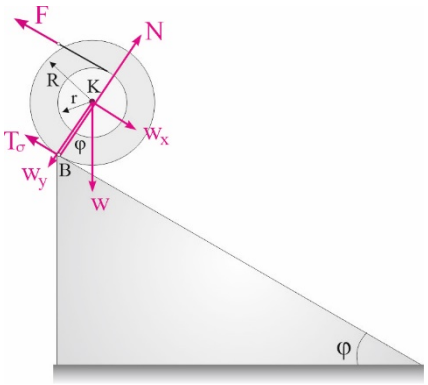
$$L_{αρχ} = L_{τελ} \Rightarrow m_1 υ_1 d = -m_1 υ_1 + {}_2υ_2 \frac{d}{2} \Rightarrow υ_2 = \frac{3m_1 υ_1}{m_2}$$

$$K_{αρχ} = K_{τελ} \Rightarrow \frac{1}{2} m_1 υ_1^2 = \frac{1}{2} m_1 υ_1^2 + \frac{1}{2} {}_2υ_2^2 \Rightarrow {}_2 = {}_1$$

ΘΕΜΑ Γ

Γ1.

$$Στ_{(B)} = 0 \Rightarrow wημφR = F(r + R) \Rightarrow r = \frac{R}{3} = 0,04m$$



Γ2. $ΣF_x = 0 \Rightarrow w_x = T_σ + F \Rightarrow T_σ = 1N$

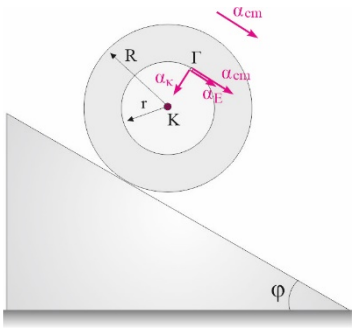
$$ΣF_y = 0 \Rightarrow w_y = N = 3N \qquad T_σ = μ_σ N \Rightarrow μ_σ = \frac{1}{3}$$

Γ3.

$$α_{cm} = α_{γων} R = 6m/s^2$$

$$υ_{cm} = α_{cm} t \Rightarrow t = 0,5s$$

$$d = \frac{1}{2} α_{cm} t^2 = \frac{3}{4} m$$



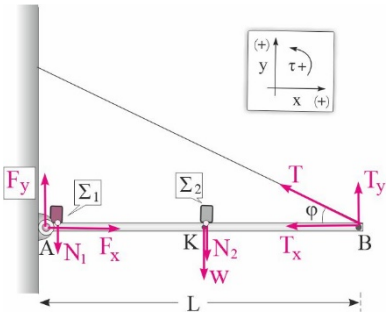
Γ4. $α_ε = α_{γων} r = 2m/s^2$

$$α_κ = \frac{υ^2}{r} = ω^2 r = (α_{γων} t)^2 r \Rightarrow α_κ = 25m/s^2$$

$$α_Γ = \sqrt{(α_{cm} + α_ε)^2 + α_κ^2} = \sqrt{689} \Rightarrow α_Γ = 26,25m/s^2$$

ΘΕΜΑ Δ

Δ1. $$\Sigma\tau_{(A)} = 0 \Rightarrow Mg\frac{L}{2} + N_2\frac{L}{2} = T\eta\mu\varphi L \Rightarrow T = 30N$$



με $N_2 = m_2 g \Rightarrow N_2 = 10N$

Δ 2 . $$t_1 = t_2 \Rightarrow \frac{KA}{|\upsilon_1'|} = \frac{KB}{\upsilon_2'} \Rightarrow |\upsilon_1| = \upsilon_2 \Rightarrow \upsilon_1 = -\upsilon_2$$

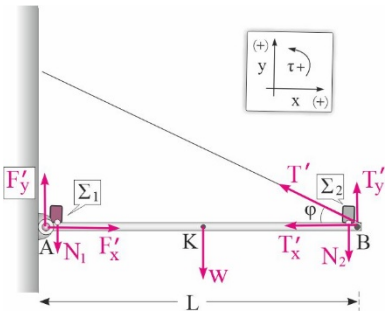
$$\upsilon_1' = -\upsilon_2' \Rightarrow \frac{m_1 - m_2}{m_1 + m_2}\upsilon_0 = -\frac{2m_1}{m_1 + m_2}\upsilon_0 \Rightarrow$$

$$m_1 = \frac{m_2}{3} = \frac{1}{3}kg$$

Δ3. $$\upsilon_1' = \frac{m_1 - m_2}{m_1 + m_2}\upsilon_0 = -\frac{\upsilon_0}{2}$$

$$t_{o\lambda} = \frac{AK}{\upsilon_0} + \frac{KA}{|\upsilon_1'|} = \frac{\frac{L}{2}}{\upsilon_0} + \frac{\frac{L}{2}}{\frac{\upsilon_0}{2}} \Rightarrow \upsilon_0 = 1m/s$$

Δ4. $$\Sigma\tau_{(A)} = 0 \Rightarrow Mg\frac{L}{2} + N_2 L = T'\eta\mu\varphi L \Rightarrow T' = 40N$$



$$\Sigma F_y = 0 \Rightarrow w + N_1 + N_2 = F'_y + T'_y \Rightarrow F'_y = \frac{40}{3}N$$

με $N_1 = m_1 g \Rightarrow N_1 = \frac{10}{3}N$

$$F' = \sqrt{F_x'^2 + F_y'^2} = \frac{\sqrt{12400}}{3} \Rightarrow F' = 37N$$