

**ΦΥΣΙΚΗ ΚΑΤΕΥΘΥΝΣΗΣ Γ' ΛΥΚΕΙΟΥ 29 / 5 / 08**

**ΕΝΔΕΙΚΤΙΚΕΣ ΑΠΑΝΤΗΣΕΙΣ**

**ΘΕΜΑ 1<sup>ο</sup>**

1 → δ

2 → α

3 → γ

4 → δ

5. α → Λ, β → Λ, γ → Λ, δ → Σ, ε → Σ

**ΘΕΜΑ 2<sup>ο</sup>**

1.

Σωστό το (β)

$$\left. \begin{aligned} \frac{t}{T} = 12 \cdot 10^{12} t \Rightarrow T = \frac{1}{12 \cdot 10^{12}} \text{ sec} \\ \frac{x}{\lambda} = 6 \cdot 10^4 x \Rightarrow \lambda = \frac{1}{6 \cdot 10^4} \text{ m} \end{aligned} \right\} \Rightarrow v = \frac{\lambda}{T} = 2 \cdot 10^8 \text{ m/sec}$$

$$n = \frac{c}{v} = \frac{3 \cdot 10^8}{2 \cdot 10^8} = 1,5$$

2.

Σωστό το (α)

$$\frac{U_E}{U_B} = \frac{U_E}{E - U_E} = \frac{\frac{1}{2} \frac{1}{C} \cdot q^2}{\frac{1}{2} \frac{1}{C} \cdot Q^2 - \frac{1}{2} \frac{1}{C} \cdot q^2} = \frac{\frac{Q^2}{9}}{Q^2 - \frac{Q^2}{9}} = \frac{\cancel{Q^2}}{\cancel{Q^2} - \cancel{Q^2}} = \frac{1}{8}$$

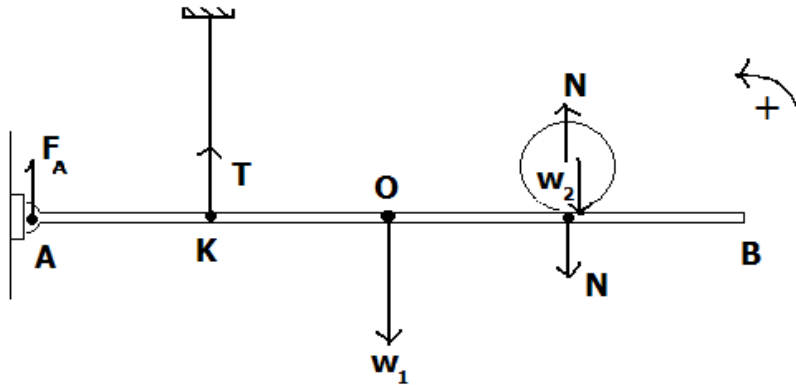
3.

Σωστό το (γ)

$$\left. \begin{aligned} \omega_1 = 998\pi \Rightarrow 2\pi f_1 = 998\pi \Rightarrow f_1 = 499 \text{ Hz} \\ \omega_2 = 1002\pi \Rightarrow 2\pi f_2 = 1002\pi \Rightarrow f_2 = 501 \text{ Hz} \end{aligned} \right\} \Rightarrow T_\delta = \frac{1}{|f_1 - f_2|} \Rightarrow T_\delta = \frac{1}{2} \Rightarrow T_\delta = 0,5 \text{ sec}$$

**ΘΕΜΑ 3<sup>ο</sup>**

α)

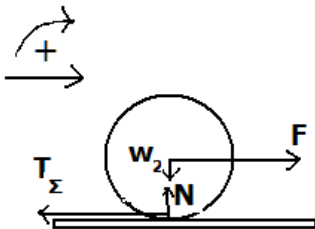


Για τη σφαίρα :  $\Sigma F_y = 0 \Rightarrow N = W_2 = 25\text{N}$

Για τη ράβδο :  $\Sigma \tau_{(A)} = 0 \Rightarrow T \cdot (AK) - W_1 \cdot \frac{L}{2} - N \cdot \frac{3L}{4} = 0 \Rightarrow T = 115\text{N}$

β) Σφαίρα που κυλίνεται χωρίς να ολισθαίνει.

$$\left. \begin{array}{l} 2^\circ \text{ N.N. } \Sigma F = M \cdot \alpha_{\text{cm}} \Rightarrow F - T = M \cdot \alpha_{\text{cm}} \\ \text{ΘΝΣΚ } \Sigma \tau_{\text{cm}} = I_{\text{cm}} \cdot \alpha_{\text{γωv.}} \Rightarrow T_\Sigma \cdot R = \frac{2}{5} M \cdot R^2 \cdot \frac{\alpha_{\text{cm}}}{R} \end{array} \right\} \Rightarrow F = \frac{7}{5} M \cdot \alpha_{\text{cm}} \Rightarrow \alpha_{\text{cm}} = 2 \text{ m/sec}^2$$

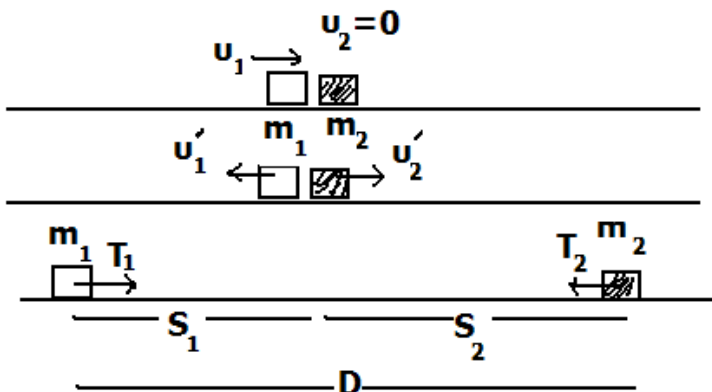


γ)

$$\left. \begin{array}{l} v_{\text{cm}} = \alpha_{\text{cm}} \cdot t \\ S = \frac{1}{2} \alpha_{\text{cm}} \cdot t^2 \Rightarrow 1 = \frac{1}{2} \cdot t^2 \Rightarrow t = 1 \text{ sec} \end{array} \right\} \Rightarrow v_{\text{cm}} = 2 \text{ m/sec}$$

δ)  $L = I_{\text{cm}} \cdot \omega = \frac{2}{5} M \cdot R^2 \cdot \frac{v_{\text{cm}}}{R} = 0,4 \text{ Kgr} \cdot \text{m}^2 / \text{sec}$

## ΘΕΜΑ 4<sup>ο</sup>



α) Από  $\Delta\Delta\text{Ο} + \Delta\Delta\text{ΚΕ}$   $-v_1' = \frac{m_1 - m_2}{m_1 + m_2} \cdot v_1 \Rightarrow \frac{m_1}{m_2} = \frac{1}{4}$

β)

$$\left. \begin{aligned} v_2' &= \frac{2m_1v_1}{m_1 + m_2} \\ \frac{m_1}{m_2} &= \frac{1}{4} \Rightarrow m_2 = 4m_1 \end{aligned} \right\} \Rightarrow v_2' = 6 \text{ m/sec}$$

γ)

1<sup>ος</sup> τρόπος

Βρίσκω το ποσοστό % που χάνει το σώμα  $m_1$

$$\frac{|K_1^{\text{αρχ.}} - K_1^{\text{τελ.}}|}{K_1^{\text{αρχ.}}} \cdot 100 = \frac{\frac{1}{2}m_1 \cdot v_1^2 - \frac{1}{2}m_1 \cdot v_1'^2}{\frac{1}{2}m_1 \cdot v_1^2} \cdot 100 = 64\%$$

2<sup>ος</sup> τρόπος

Βρίσκω το ποσοστό % που παίρνει το σώμα  $m_2$

$$\frac{K_2'}{K_1} \cdot 100 = \frac{\frac{1}{2}m_2 \cdot v_2'^2}{\frac{1}{2}m_1 \cdot v_1^2} \cdot 100 = 4 \cdot \frac{36}{225} \cdot 100 = 64\%$$

δ)

**1<sup>ος</sup> τρόπος**

$$m_1 : \Sigma F_y = 0 \Rightarrow N_1 = W_1 \text{ οπότε } T_1 = \mu \cdot N_1 = \mu \cdot m_1 g = m_1$$

$$\text{ΘΜΚΕ } m_1 : \cancel{K_T}^0 - K_\alpha = \cancel{W_{N_1}}^0 + \cancel{W_{W_1}}^0 + W_{T_1} \Rightarrow -\frac{1}{2} m_1 \cdot v_1'^2 = -T_1 \cdot S_1 \Rightarrow S_1 = 40,5 \text{ m}$$

$$m_2 : \Sigma F_y = 0 \Rightarrow N_2 = W_2 \text{ οπότε } T_2 = \mu \cdot N_2 = \mu \cdot m_2 g = m_2$$

$$\text{ΘΜΚΕ } m_2 : \cancel{K_T}^0 - K_\alpha = \cancel{W_{N_2}}^0 + \cancel{W_{W_2}}^0 + W_{T_2} \Rightarrow -\frac{1}{2} m_2 \cdot v_2'^2 = -T_2 \cdot S_2 \Rightarrow S_2 = 18 \text{ m}$$

$$\text{Άρα } D = S_1 + S_2 = 58,5 \text{ m}$$

$$\text{2<sup>ος</sup> τρόπος : } \alpha_1 = \alpha_{\Sigma_2} = \frac{|\Sigma F_x|}{m} = \frac{T}{m} = \frac{\mu \cdot m g}{m} = 1 \text{ m/sec}^2$$

$$m_1 : v_1 = v_{1_0} - \alpha \cdot t_1 \Rightarrow 0 = 9 - t_1 \Rightarrow t_1 = 9 \text{ sec} \text{ ο χρόνος που σταματά}$$

$$S_1 = v_{1_0} \cdot t_1 - \frac{1}{2} \alpha \cdot t_1^2 \Rightarrow S_1 = 40,5 \text{ m}$$

$$m_2 : v_2 = v_{2_0} - \alpha \cdot t_2 \Rightarrow 0 = 6 - t_2 \Rightarrow t_2 = 6 \text{ sec} \text{ ο χρόνος που σταματά}$$

$$S_2 = v_{2_0} \cdot t_2 - \frac{1}{2} \alpha \cdot t_2^2 \Rightarrow S_2 = 18 \text{ m}$$

$$\text{Άρα } D = S_1 + S_2 = 58,5 \text{ m}$$