ΝΕΟ ΣΥΣΤΗΜΑ – Δ΄ ΕΣΠΕΡΙΝΩΝ

ΕΠΑΝΑΛΗΠΤΙΚΕΣ ΠΑΝΕΛΛΑΔΙΚΕΣ ΕΞΕΤΑΣΕΙΣ

Δ΄ ΤΑΞΗΣ ΕΣΠΕΡΙΝΟΥ ΓΕΝΙΚΟΥ ΛΥΚΕΙΟΥ

ΔΕΥΤΕΡΑ 13 ΙΟΥΝΙΟΥ 2016

ΑΠΑΝΤΗΣΕΙΣ ΣΤΗ ΦΥΣΙΚΗ ΠΡΟΣΑΝΑΤΟΛΙΣΜΟΥ

ΘΕΜΑ Α

Α1. δ

Α2. β

Α3. γ

Α4. δ

Α5. **α.** Σωστό, **β.** Σωστό, **γ.** Λάθος, **δ.** Λάθος, **ε.** Σωστό.

ΘΕΜΑ Β

Β1. α) $\rightarrow$ ii

β) $\Delta\varphi = \frac{\pi}{2} \Rightarrow A^2 = A_1^2 + A_2^2 + \cancel{2A_1A_2\sigma\upsilon\nu\Delta\varphi} \Rightarrow$

$$A^2 = A_1^2 + A_2^2 \Rightarrow \frac{2E}{D} = \frac{2E_1}{D} + \frac{2E_2}{D} \Rightarrow E = E_1 + E_2$$

Β2. α) $\rightarrow$ ii

β) $x = 0 \rightarrow \varphi = 10\pi \rightarrow t = 2\ s$

$\varphi = \frac{2\pi t}{T} - \frac{2\pi x}{\lambda} \Rightarrow T = 0{,}4\ s$

$x = 5\ m \rightarrow \varphi = 5\pi \rightarrow t = 2\ s$

$\varphi = \frac{2\pi t}{T} - \frac{2\pi x}{\lambda} \Rightarrow \lambda = 2\ m$

$\Rightarrow \upsilon = \frac{\lambda}{T} \Rightarrow \upsilon = 5\ m/s$

Β3. α) $\rightarrow$ i

β) $P_A + \frac{1}{2}\cdot\rho\cdot\upsilon_A^2 + \rho\cdot g\cdot h = P_B + \frac{1}{2}\cdot\rho\cdot\upsilon_B^2 + \rho\cdot g\cdot\frac{h}{2} \Rightarrow \upsilon_B = \sqrt{gh}$

$h' = \frac{1}{2}\cdot g\cdot t^2 \Rightarrow \frac{h}{2} = \frac{1}{2}\cdot g\cdot t^2 \Rightarrow t = \sqrt{\frac{h}{g}}$

$x = \upsilon_B\cdot t \Rightarrow x = \sqrt{gh}\cdot\sqrt{\frac{h}{g}} \Rightarrow x = h$

ΑΙΣΧΥΛΟΥ 16 - ΠΕΡΙΣΤΕΡΙ - ΤΗΛ. 210 5710710

ΘΕΜΑ Γ

Γ1. Α.Δ.Ε.Τ. : $E = K + U \Rightarrow$

$$\frac{1}{2}\cdot k\cdot A^2 = \frac{1}{2}\cdot m_1\cdot \upsilon_1^2 + \frac{1}{2}\cdot k\cdot x_1^2 \Rightarrow$$

$$\upsilon_1 = 2\ m/s$$

Α.Δ.Ο. : $m_1\cdot \upsilon_1 - m_2\cdot \upsilon_2\cdot \sigma\upsilon\nu\varphi = (m_1 + m_2)\cdot \upsilon_\kappa \Rightarrow$

$$\upsilon_\kappa = -\frac{3}{2}\ m/s$$

Γ2. Α.Δ.Ε.Τ. : $E' = K + U \Rightarrow$

$$\frac{1}{2}\cdot k\cdot A'^2 = \frac{1}{2}\cdot (m_1 + m_2)\cdot \upsilon_\kappa^2 + \frac{1}{2}\cdot k\cdot x^2 \Rightarrow$$

$$A' = 0{,}1\cdot\sqrt{21}\ m$$

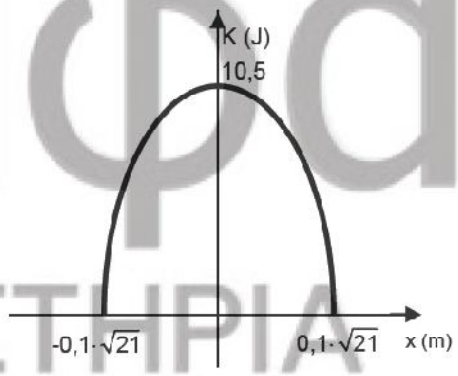
Γ3. $E = K + U \Rightarrow$

$K = E - U \Rightarrow$

$$K = \frac{1}{2}\cdot 100\cdot 0{,}01\cdot 21 - 50x^2 \Rightarrow$$

$K = 10{,}5 - 50x^2$ (S.I.)

με $-0{,}1\cdot\sqrt{21} \le x \le 0{,}1\cdot\sqrt{21}$



ΘΕΜΑ Δ

Δ1. $\Sigma F_{(3)} = 0 \Rightarrow T_3 = M_3 \cdot g = 10N$

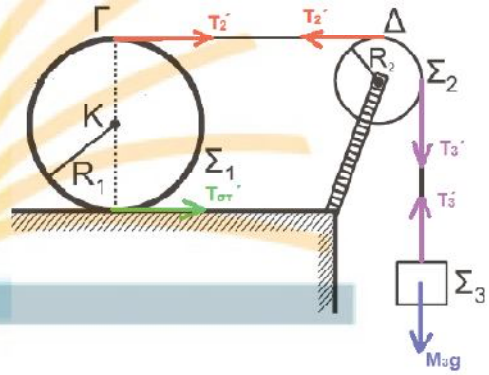
$\Sigma \tau_{(2)} = 0 \Rightarrow T_2 \cdot R_2 = T_3 \cdot R_2 \Rightarrow T_2 = T_3 = 10N$

$$\left.\begin{array}{l} \Sigma \tau_{(K)} = 0 \Rightarrow T_2 \cdot R_1 - T_{\sigma\tau} \cdot R_1 - \dfrac{T_1 \cdot R_1}{2} = 0 \\ \Sigma F_x = 0 \Rightarrow T_2' + T_{\sigma\tau} = T_1 \Rightarrow T_{\sigma\tau} = T_1 - 10 \end{array}\right\} \Rightarrow \boxed{T_1 = \frac{40}{3} N}$$

Δ2. Δίσκος

$$\left.\begin{array}{l} T_2' + T_{\sigma\tau}' = M_1 \cdot \alpha_{cm} \\ T_2' \cdot R_1 - T_{\sigma\tau}' \cdot R_1 = \dfrac{1}{2} \cdot M_1 \cdot R_1^2 \cdot \alpha_\gamma \end{array}\right\} \rightarrow$$

$$T_2' = \frac{3}{4} \cdot M_1 \cdot \alpha_{cm} \quad (1)$$



Τροχαλία

$$T_3' R_2 - T_2' R_2 = \frac{1}{2} \cdot M_2 \cdot R_2^2 \cdot \alpha_{\gamma\,τροχ} \Rightarrow T_3' - T_2' = \frac{1}{2} \cdot M_2 \cdot R_2 \cdot \alpha_{\gamma\,τροχ} \Rightarrow$$

$$T_3' - T_2' = \frac{1}{2} \cdot M_2 \cdot 2\alpha_{cm} \rightarrow T_3' - T_2' = M_2 \cdot \alpha_{cm} \quad (2)$$

Σ_3 : $\boxed{M_3 \cdot g - T_3' = M_3 \cdot 2\alpha_{cm} \quad (3)}$

$$(1),(2),(3) \overset{(+)}{\Rightarrow} M_3 \cdot g = \frac{3}{4} \cdot M_1 \cdot \alpha_{cm} + M_2 \cdot \alpha_{cm} + 2M_3 \cdot \alpha_{cm} \Rightarrow \boxed{\alpha_{cm} = 1 m/s^2}$$

Δ3. $\alpha_{γ.τροχ} \cdot R_2 = 2 \cdot \alpha_{cm} \Rightarrow \alpha_{γ.τροχ} = 20\ rad/s^2$

$$L_2 = I_{τροχ} \cdot \omega_2 = \frac{1}{2} \cdot M_2 \cdot R_2^2 \cdot \alpha_{γ.τροχ} \cdot t \Rightarrow \boxed{L_2 = 0,2 \frac{Kg \cdot m^2}{s}}$$