

ΠΑΝΕΛΛΑΔΙΚΕΣ ΕΞΕΤΑΣΕΙΣ
ΗΜΕΡΗΣΙΩΝ & ΕΣΠΕΡΙΝΩΝ ΓΕΝΙΚΩΝ ΛΥΚΕΙΩΝ
ΔΕΥΤΕΡΑ 8 ΙΟΥΝΙΟΥ 2026
ΕΞΕΤΑΖΟΜΕΝΟ ΜΑΘΗΜΑ: ΦΥΣΙΚΗ ΠΡΟΣΑΝΑΤΟΛΙΣΜΟΥ

ΘΕΜΑ Α

A1. δ

A2. β

A3. α

A4. γ

A5.

α. Σωστό

β. Σωστό

γ. Λάθος

δ. Λάθος

ε. Σωστό

ΘΕΜΑ Β

B1. (iii)

Αρχικά $L = \frac{\lambda_1}{2} + \frac{\lambda_1}{4}$

Τελικά: $L = \frac{2\lambda_2}{2} + \frac{\lambda_2}{4}$

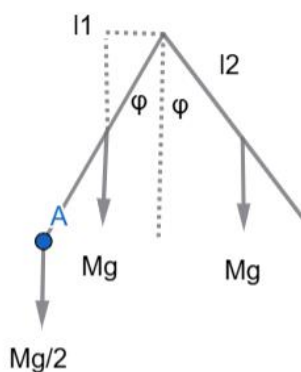
Επειδή είναι ίδια η χορδή:

$$\frac{\lambda_1}{2} + \frac{\lambda_1}{4} = \lambda_2 + \frac{\lambda_2}{4} \Rightarrow \frac{3\lambda_1}{4} = \frac{5\lambda_2}{4} \Rightarrow 3v_\delta T_1 = 3v_\delta T_2 \Rightarrow \frac{T_1}{T_2} = \frac{5}{3}$$

B2. (i)

$$\left. \begin{array}{l} I_1 = I \\ I_2 = 2I \\ d = \frac{r}{2} \\ I'_2 = 4I \end{array} \right\} \Rightarrow \left. \begin{array}{l} F_1 = \frac{\mu_0}{4\pi} \frac{2I_1 I_2 \ell}{r} \\ F_2 = \frac{\mu_0}{4\pi} \frac{2I_1 I'_2 \ell}{\frac{3r}{2}} \end{array} \right\} \Rightarrow \left. \begin{array}{l} \frac{F_1}{F_2} = \frac{I_2}{2I'_2} = \frac{2I}{2 \cdot 4I} \\ \frac{F_1}{F_2} = \frac{3}{4} \end{array} \right\} \Rightarrow \frac{F_1}{F_2} = \frac{3}{4}$$

B3. (ii)



$$m = \frac{M}{2}$$

$$\Sigma \vec{\tau} = \vec{0} \Rightarrow Mg \frac{l_1}{2} \eta \mu \varphi + \frac{Mg}{2} l_1 \eta \mu \varphi = Mg \frac{l_2}{2} \eta \mu \varphi \Rightarrow l_1 + l_1 = l_2 \Rightarrow l_1 = 2l_2 \Rightarrow \frac{l_1}{l_2} = \frac{1}{2}$$

ΘΕΜΑ Γ

$$\lambda = 8\lambda_c$$

$$\lambda_c = \frac{h}{mc}$$

Γ1.

$$\lambda' - \lambda = \lambda_c (1 - \sigma \nu \nu 180^\circ) \Rightarrow \lambda' - \lambda = \lambda_c [1 - (-1)] \Rightarrow \lambda' - 8\lambda_c = 2\lambda_c \Rightarrow \lambda' = 10\lambda_c$$

Γ2.

$$E_\varphi = h \frac{c}{\lambda} = \frac{hc}{8 \cdot \lambda_c} = \frac{hc}{\frac{8h}{mc}} = \frac{mc^2}{8}$$

$$E'_\varphi = h \frac{c}{\lambda'} = \frac{hc}{10h} = \frac{mc^2}{10}$$

$$\text{ΑΔΕ: } E_{\varphi} = E'_{\varphi} + K_{e^{-}} \Rightarrow K_{e^{-}} = \frac{mc^2}{8} - \frac{mc^2}{10} = \frac{mc^2}{40} = \frac{5 \cdot 10^5}{40} \Rightarrow K_{e^{-}} = \frac{10^5}{8} eV$$

Γ3.

$$\lambda_1 = 400nm$$

$$\varphi = 1,4eV$$

f_0 : είναι η τιμή της συχνότητας της προσπίπτουσας ακτινοβολίας, για την οποία οριακά εξέρχονται τα φωτοηλεκτρόνια.

Από την φωτοηλεκτρική εξίσωση με $K_{\max} = 0$:

$$0 = hf - \varphi \Rightarrow f_0 = \frac{\varphi}{h} = \frac{1,4 \cdot 1,6 \cdot 10^{-19}}{6,4 \cdot 10^{-34}} \Rightarrow f_0 = \frac{0,7}{2} 10^{15} = 0,35 \cdot 10^{15} \text{ Hz}$$

Γ4. ΘΜΚΕ για τα πιο κινητικά φωτοηλεκτρόνια που οριακά φτάνουν στην άνοδο, χωρίς να έρθουν σε επαφή με αυτήν:

$$K_{\alpha v} - K_{\kappa\alpha\theta} = W_{F\eta\lambda} \Rightarrow 0 - K_{\max} = -eV_0 \Rightarrow K_{\max} = eV_0 \Rightarrow hf - \varphi = eV_0 \Rightarrow V_0 = \frac{hc}{\lambda e} - \frac{\varphi}{e} \Rightarrow$$

$$V_0 = \frac{1200eV \cdot nm}{400nm \cdot e} - \frac{1,4eV}{e} \Rightarrow V_0 = 3V - 1,4V \Rightarrow V_0 = 1,6V$$

ΘΕΜΑ Δ

Δ1.

$$m_2: F = T_v + m_2g \Rightarrow T_v = 3 - 1 \Rightarrow T_v = 2N$$

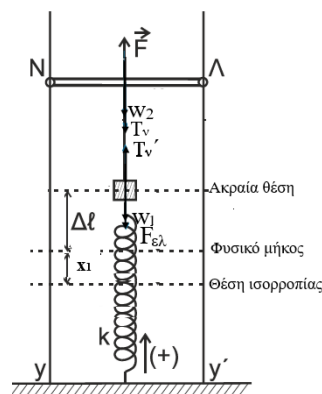
$$(I): \Sigma \vec{F} = \vec{0} \Rightarrow T_v = m_1g + k\Delta\ell \Rightarrow 2 = 1 + 10\Delta\ell \Rightarrow \Delta\ell = 0,1m$$

$$(II): \Sigma \vec{F} = \vec{0} \Rightarrow m_1g = kx_1 \Rightarrow x_1 = 0,1m$$

$$A = x_1 + \Delta\ell = 0,2m$$

$$t_0 = +A \Rightarrow \varphi_0 = \frac{\pi}{2} \text{ rad}$$

$$\omega = \sqrt{\frac{k}{m_1}} = 10 \text{ rad/s} \text{ άρα } x = 0,2\eta\mu\left(10t + \frac{\pi}{2}\right) (SI)$$



Δ2.

$$a =;$$

$$\frac{K}{E} = \frac{3}{4} \Rightarrow K = \frac{3E}{4}$$

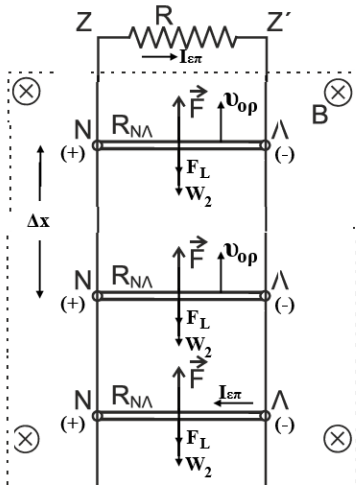
ΑΔΕΤ:

$$E = U + K \Rightarrow E = U + \frac{3E}{4} \Rightarrow U = \frac{E}{4} \Rightarrow \frac{1}{2}kx^2 = \frac{1}{4} \cdot \frac{1}{2}kA^2 \Rightarrow x = \pm \frac{A}{2} \Rightarrow x = \pm 0,1m$$

$$a = -\omega^2 x \Rightarrow a = -100(\pm 0,1) \Rightarrow a = \pm 10 \text{ m/s}^2, \text{ \u0391\u03c1\u0381 } |\alpha| = 10 \text{ m/s}^2$$

\u03943. \u0397 \u03c1\u03ac\u03b2\u03b4\u03bf\u03c2 (N\u039b) \u03b5\u03ba\u03c4\u03b5\u03bb\u03b5\u03b9 \u03b5\u03c0\u03b9\u03c4\u03b1\u03c7\u03bd\u03cc\u03bc\u03b5\u03bd\u03b7 \u03ba\u03b9\u03bd\u03b7\u03c3\u03b7 \u03bc\u03b5 \u03bc\u03b5\u03b9\u03cc\u03c5\u03bc\u03b5\u03bd\u03b7 \u03b5\u03c0\u03b9\u03c4\u03b1\u03c7\u03bd\u03cc\u03c3\u03b7 \u03bc\u03b5\u03c7\u03c1\u03b9 \u03bd\u03b1 \u03b1\u03c0\u03bf\u03ba\u03c4\u03b7\u03c3\u03b5 \u03bc\u03b5\u03b3\u03b9\u03c3\u03c4\u03b7 \u03ba\u03b1\u03b9 \u03c3\u03c4\u03b1\u03b8\u03b5\u03c1\u03b7 \u03c4\u03b1\u03c7\u03c5\u03c4\u03b7\u03c4\u03b1 u_{op}

$$v_{op} : \Sigma \vec{F} = \vec{0} \Rightarrow F = F_L + m_2 g \Rightarrow F = \frac{B^2 u_{op}^2 \ell^2}{R_{\text{ολ}}} + m_2 g \Rightarrow 3 = \frac{u_{op}}{2} + 1 \Rightarrow u_{op} = 4 \text{ m/s} \quad (R_{\text{ολ}} = R + R_{N\Lambda} = 2\Omega)$$



\u03944.

$$\Delta t = 0,125 \text{ sec}$$

$$h = u_{op} \Delta t = 4 \cdot 0,125 = 0,5 \text{ m}, \text{ \u0391\u03c1\u0381 } W_F = F \cdot h = 1,5 \text{ J}$$

$$I_{\u03b5\u03c0} = \frac{E_{\u03b5\u03c0}}{R_{\text{ολ}}} = \frac{B u_{op} \ell}{R_{\text{ολ}}} = \frac{4}{2} = 2 \text{ A}$$

$$Q = I^2 R_{\text{ολ}} \Delta t = 4 \cdot 2 \cdot 0,125 = 1 \text{ J} \text{ \u0391\u03c1\u0381 } \Pi = \frac{Q}{W_F} \cdot 100\% = \frac{1}{1,5} \cdot 100\% = \frac{200}{3} \%$$

Επι\u03bc\u03b5\u03bb\u03b5\u03b9\u03b1: \u0392\u03bb\u03b1\u03c7\u03cc\u03c0\u03bf\u03c5\u03bb\u03bf\u03c2 \u038c\u03c1\u03b7\u03c3

\u0393\u03ba\u03b9\u03c9\u03bd\u03b7 \u0392\u03b1\u03c3\u03b9\u03bb\u03b9\u03ba\u03b7

\u039b\u03b5\u03b2\u03b5\u03c4\u03b1\u03c3 \u03a3\u03c4\u03ac\u03b8\u03b7\u03c3

\u03a3\u03b1\u03b3\u03bd\u03cc\u03c3 \u03a3\u03c9\u03ba\u03c1\u03ac\u03c4\u03b7\u03c3

\u03a3\u03b1\u03ba\u03b5\u03bb\u03bb\u03b1\u03c1\u03b9\u03cc\u03c5 \u038c\u03c1\u03b7\u03c3\u03c4\u03bf\u03c3