08 επαναληπτικά **θέματα**
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Γ' ΛΥΚΕΙΟΥ
ΘΕΤΙΚΗ & ΤΕΧΝΟΛΟΓΙΚΗ
ΚΑΤΕΥΘΥΝΣΗ

ΦΥΣΙΚΗ

ΑΠΑΝΤΗΣΕΙΣ

ΘΕΜΑ 1ο
1. γ
2. δ
3. β
4. γ
5. **(α)** Σ
   (β) Λ
   (γ) Σ
   (δ) Σ
   (ε) Λ

ΘΕΜΑ 2ο

1. $\dfrac{K}{U} = \dfrac{E-U}{U} = \dfrac{\frac{1}{2}DA^2 - \frac{1}{2}D\frac{A^2}{4}}{\frac{1}{2}D\frac{A^2}{4}} = 3$ **Σωστό το γ.**

2. $E = 25\% E_0 \Rightarrow \dfrac{1}{2}DA^2 = \dfrac{1}{4}\cdot\dfrac{1}{2}DA_0^2 \Rightarrow A = \dfrac{A_0}{2}$ **Σωστό το α.**

3. **α.** Σωστή ($T_0 = T$ γιατί $f =$ σταθερή)
   β. Λάθος

$8\pi 10^6 x = 2\pi \dfrac{x}{\lambda} \Rightarrow \lambda = \dfrac{10^{-6}}{4} m$

$4\pi 10^6 x = 2\pi \dfrac{x}{\lambda_0} \Rightarrow \lambda_0 = \dfrac{10^{-6}}{2} m$

Άρα $n = \dfrac{\lambda_0}{\lambda} = \dfrac{\frac{10^{-6}}{2}}{\frac{10^{-6}}{4}} = 2$

$\eta\mu\theta_{\kappa\rho} = \dfrac{n_{\alpha\acute{\epsilon}\rho\alpha}}{n} = \dfrac{1}{2} \Rightarrow \theta_{\kappa\rho} = 30°$

άρα παθαίνει ΟΛΙΚΗ ΑΝΑΚΛΑΣΗ

4. $L = I\omega \Rightarrow L = I a_{\gamma\omega\nu} t \Rightarrow \dfrac{L}{t} = I a_{\gamma\omega\nu}$

$\left.\begin{array}{l} \varepsilon\phi\theta_1 = \dfrac{2L}{t} \\[2mm] \varepsilon\phi\theta_2 = \dfrac{L}{t} \end{array}\right\} \Rightarrow \varepsilon\phi\theta_1 = 2\varepsilon\phi\theta_2 \Rightarrow I\alpha_{\gamma\omega\nu 1} = 2I\alpha_{\gamma\omega\nu 2} \Rightarrow \alpha_{\gamma\omega\nu 1} = 2\alpha_{\gamma\omega\nu 2}$. Σωστό το **β**.

ΘΕΜΑ 3ο

$A = 0,1m$
$2T = 0,4s \Rightarrow T = 0,2s$
$f = 5Hz$
$\omega = 10\pi \dfrac{rad}{s}$

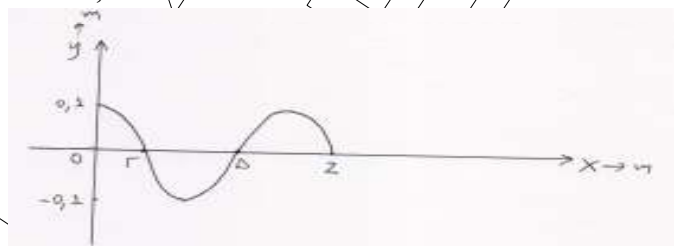**α)** $\upsilon = \dfrac{x}{t} = \dfrac{4}{0,4} = 10 \dfrac{m}{s}$

$\lambda = \dfrac{\upsilon}{f} = \dfrac{10}{5} = 2m$

β) $\phi = \omega t \Rightarrow 10\pi t = 3,75\pi \Rightarrow t = 0,375s$
Το κύμα έχει διαδοθεί σε απόσταση: $x = \upsilon t = 3,75m$

$\upsilon = \upsilon_{\max} \sigma\upsilon\nu 2\pi\left(\dfrac{t}{\tau} - \dfrac{x}{\lambda}\right) = 0,1 \cdot 10\pi \sigma\upsilon\nu 2\pi\left(\dfrac{0,375}{0,2} - \dfrac{3}{2}\right) =$

$= \pi \sigma\upsilon\nu 2\pi(1,875 - 1,5) =$

$= \pi \sigma\upsilon\nu \dfrac{3\pi}{4} = \pi\left(-\dfrac{\sqrt{2}}{2}\right) = -\dfrac{\pi\sqrt{2}}{2} \dfrac{m}{s}$

γ) $\dfrac{t}{T} = \dfrac{0,25}{0,2} = 1,25 \Rightarrow t = 1,25T$

$K_{\max}$ έχουν τα σημεία Γ, Δ, Ζ

$x_\Gamma = \dfrac{\lambda}{4} = 0,5m$

$x_\Delta = \dfrac{3\lambda}{4} = 1,5m$

$x_Z = \dfrac{5\lambda}{4} = 2,5m$

δ) $A = A_1 - A_2 \Rightarrow 0,1 = A_1 - 0,1 \Rightarrow A_1 = 0,2m$

$y_1 = 0,2 \eta\mu 10\pi t \quad (SI)$

ΘΕΜΑ 4ο

α)

$I = I_{\delta\alpha\kappa\tau} + 2I_{\rho\alpha\beta\delta}$

$I_{\delta\alpha\kappa\tau} = MR^2 = 6 kgm^2$

$\left. \begin{array}{c} \\ \\ \\ \end{array} \right\} \Rightarrow I = 8 kgm^2$

$I_{\rho\alpha\beta\delta} = \dfrac{1}{12} m l^2 = \dfrac{1}{12} 3 \cdot 2^2 = 1 kgm^2$

β) $M_{o\lambda} = M + 2m = 12 Kg$

$\Sigma F_y = 0 \Rightarrow N = M_{o\lambda} g \sigma\upsilon\nu\phi \quad (1)$

$\Sigma F_x = M_{o\lambda} a_{cm} \Rightarrow F - T_{\sigma\tau} - M_{o\lambda} g \eta\mu\phi = M_{o\lambda} a_{cm} \Rightarrow T_{\sigma\tau} = F - M_{o\lambda} g \eta\mu\phi - M_{o\lambda} a_{cm} \,(2)$

$\Sigma \tau_{cm} = I \cdot a_{\gamma\omega\nu} \Rightarrow T_{\sigma\tau} \cdot R = I \dfrac{a_{cm}}{R} \Rightarrow T_{\sigma\tau} = \dfrac{I}{R^2} a_{cm} \quad (3)$

$(2)(3): \; F - M_{o\lambda} g \eta\mu\phi - M_{o\lambda} a_{cm} = \dfrac{I}{R^2} a_{cm} \Rightarrow a_{cm} = 2 \dfrac{m}{s^2}$

$(3) \; T_{\sigma\tau} = 16 N$

γ) $\dfrac{dK_{\sigma\tau\rho\sigma\phi}}{dt} = \Sigma \tau \cdot \omega = T_{\sigma\tau} R \omega \quad (4)$

$N = \dfrac{\theta}{2\pi} \Rightarrow \theta = N \cdot 2\pi = 25 rad$

$\theta = \dfrac{1}{2} a_{\gamma\omega\nu} t^2 \Rightarrow t = \sqrt{\dfrac{2\theta}{a_{\gamma\omega\nu}}} = \sqrt{\dfrac{2 \cdot 25}{2}} = 5s$

$\omega = a_{\gamma\omega\nu} t = 10 \dfrac{rad}{s}$

$(4) \Rightarrow \dfrac{dK_{\sigma\tau\rho\sigma\phi}}{dt} = 160 \dfrac{J}{s}$

δ) Μετά το Β δεν υπάρχει $T_{\sigma\tau}$ οπότε η στροφική κίνηση είναι ομαλή.

$A\Delta ME: \; U_B + K_B = U_\Gamma + K_\Gamma \quad (5)$

$U_B = M_{o\lambda} g h$

$K_B = \dfrac{1}{2} I \omega_B^2 + \dfrac{1}{2} M_{o\lambda} \upsilon_B^2$

$K_\Gamma = \dfrac{1}{2} I \omega_B^2 + \dfrac{1}{2} M_{o\lambda} \upsilon_\Gamma^2$

$(5) \Rightarrow \upsilon_\Gamma = 12 m/s$