



08 επαναληπτικά θέματα

Γ' ΛΥΚΕΙΟΥ ΘΕΤΙΚΗ & ΤΕΧΝΟΛΟΓΙΚΗ ΚΑΤΕΥΘΥΝΣΗ ΦΥΣΙΚΗ

ΑΠΑΝΤΗΣΕΙΣ

ΘΕΜΑ 1^ο

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

ΘΕΜΑ 2^ο

1.
$$\frac{K}{U} = \frac{E - U}{U} = \frac{\frac{1}{2} D A^2 - \frac{1}{2} D \frac{A^2}{4}}{\frac{1}{2} D \frac{A^2}{4}} = 3$$
 Σωστό το γ.
2.
$$E = 25\% E_0 \Rightarrow \frac{1}{2} D A^2 = \frac{1}{4} \cdot \frac{1}{2} D A_0^2 \Rightarrow A = \frac{A_0}{2}$$
 Σωστό το α.
3. α. Σωστή. ($K = T$ γιατί f = σταθερή)
 β. Λάθος

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

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

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

$$\eta_{\mu\theta_{kp}} = \frac{n_{\alpha\rho\alpha}}{n} = \frac{1}{2} \Rightarrow \theta_{kp} = 30^\circ$$

 άρα παθαίνει ΟΛΙΚΗ ΑΝΑΚΛΑΣΗ

$$4. \quad L = I\omega \Rightarrow L = Ia_{\gamma\omega\nu} t \Rightarrow \frac{L}{t} = Ia_{\gamma\omega\nu}$$

$$\left. \begin{array}{l} \varepsilon\phi\theta_1 = \frac{2L}{t} \\ \varepsilon\phi\theta_2 = \frac{L}{t} \end{array} \right\} \Rightarrow \varepsilon\phi\theta_1 = 2\varepsilon\phi\theta_2 \Rightarrow I\alpha_{\gamma\omega\nu 1} = 2I\alpha_{\gamma\omega\nu 2} \Rightarrow \alpha_{\gamma\omega\nu 1} = 2\alpha_{\gamma\omega\nu 2}. \text{ Σωστό το } \beta.$$

ΘΕΜΑ 3^o

$$A = 0,1m$$

$$2T = 0,4s \Rightarrow T = 0,2s$$

$$f = 5Hz$$

$$\omega = 10\pi \frac{rad}{s}$$

$$a) \quad v = \frac{x}{t} = \frac{4}{0,4} = 10 \frac{m}{s}$$

$$\lambda = \frac{v}{f} = \frac{10}{5} = 2m$$

$$\beta) \quad \phi = \omega t \Rightarrow 10\pi t = 3,75\pi \Rightarrow t = 0,375s$$

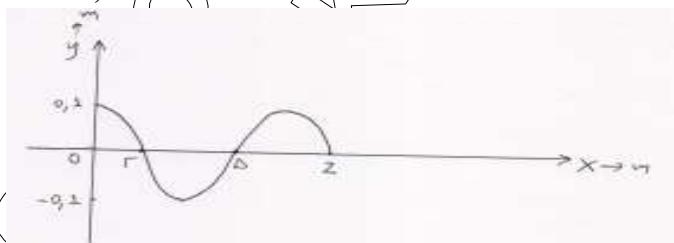
Το κύμα έχει διαδοθεί σε απόσταση: $x = vt = 3,75m$

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

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

$$= \pi \sigma v \nu \frac{3\pi}{4} = \pi \left(\frac{\sqrt{2}}{2} \right) = \frac{\pi \sqrt{2} m}{2 s}$$

$$\gamma) \quad \frac{t}{T} = \frac{0,25}{0,2} = 1,25 \Rightarrow t = 1,25T$$



K_{max} έχουν τα σημεία Γ, Δ, Z

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

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

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

δ) $A = A_1 - A_2 \Rightarrow 0,1 = A_1 - 0,1 \Rightarrow A_1 = 0,2m$
 $y_1 = 0,2\eta\mu 10\pi t \text{ (SI)}$

ΘΕΜΑ 4^ο

α)

$$\left. \begin{aligned} I &= I_{\delta\alpha\kappa\tau} + 2I_{\rho\alpha\beta\delta} \\ I_{\delta\alpha\kappa\tau} &= MR^2 = 6kgm^2 \\ I_{\rho\alpha\beta\delta} &= \frac{1}{12}ml^2 = \frac{1}{12}3 \cdot 2^2 = 1kgm^2 \end{aligned} \right\} \Rightarrow I = 8kgm^2$$

β) $M_{o\lambda} = M + 2m = 12Kg$

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

$\Sigma Fx = M_{o\lambda}\alpha_{cm} \Rightarrow F - T_{\sigma\tau} - M_{o\lambda}g\eta\mu\phi = M_{o\lambda}\alpha_{cm} \Rightarrow T_{\sigma\tau} = F - M_{o\lambda}g\eta\mu\phi - M_{o\lambda}\alpha_{cm} \quad (2)$

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

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

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

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

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

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

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

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

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

ΑΔΜΕ: $U_B + K_B = U_\Gamma + K_\Gamma \quad (5)$

$U_B = M_{o\lambda}gh$

$K_B = \frac{1}{2} I \omega_B^2 + \frac{1}{2} M_{o\lambda} v_B^2$

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

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