**Προτεινόμενες απαντήσεις Φυσικής Προσανατολισμού**

**Γ΄ Γενικού Λυκείου**

**Θέμα Α**

Α1. β

Α2. γ

Α3. β

Α4. δ

Α5.

α) Σ

β) Λ

γ) Σ

δ) Λ

ε) Λ

**θέμα Β**

Β1.

α) σωστό το iii.

β) γνωρίζουμε ότι

$$f_{\beta\rho\acute{\alpha}\chi o\upsilon} = \frac{u}{u - \frac{u_{\eta\chi o\upsilon}}{10}} \cdot f_s = \frac{10}{9} \cdot f_s.$$

$$f_1 = \frac{u}{u + \frac{u_{\eta\chi o\upsilon}}{10}} = \frac{10}{11} \cdot f_s$$

Όμως $f_2 = f_{\beta\rho\acute{\alpha}\chi o\upsilon} = \frac{10}{9} \cdot f_s$

Άρα $\frac{f_1}{f_2} = \frac{9}{11}$.

Β2.

α) σωστό το i

β) $A' = 2A\left|\sigma\upsilon\nu\frac{2\pi x}{\lambda}\right| = 2A\left|\sigma\upsilon\nu\frac{2\pi\frac{9\lambda}{9}}{\lambda}\right| = 2A\frac{\sqrt{2}}{2} = A\sqrt{2}$.

$u_{max} = \omega A' = \frac{2\pi}{T} \cdot A \cdot \sqrt{2}.$

B3.

α) σωστό το ii

β) ισχύει $\Pi_A = \Pi_B \Longrightarrow A_A u_A = A_B u_B \Longrightarrow 2A_B u_A = A_B u_B \Longrightarrow u_B = 2u_A$.

Από δεδομένο $\frac{K_A}{V} = \frac{1}{2}\rho {u_A}^2 = \Lambda$ $\quad$ $άρα:$ $\frac{K_B}{V} = \frac{1}{2}\rho {u_B}^2 = \frac{1}{2}\rho 4{u_A}^2 = 4\Lambda$

Από την εξίσωση Bernoulli

$$p_A + \frac{1}{2}\rho {u_A}^2 = p_B + \frac{1}{2}\rho {u_B}^2 \Longrightarrow \Delta P = \frac{1}{2}\rho {u_B}^2 - \frac{1}{2}\rho {u_A}^2 \Longrightarrow \Delta P = 4\Lambda - \Lambda = 3\Lambda.$$

**Θέμα Γ**

Γ1.

$E_{\mu\eta\chi A} = E_{\mu\eta\chi B} \Longrightarrow mgR = \frac{1}{2}m_1{u_1}^2 \Longrightarrow u_1 = \sqrt{2gR} \Longrightarrow u_1 = \frac{10m}{s}.$

Γ2.

$K_{1\tau} - K_{1\alpha} = W_T \Rightarrow \frac{1}{2}m{u_1}^2 - \frac{1}{2}m{u_\Gamma}^2 = -\mu m_1 g S_1 \Longrightarrow u_1 = \sqrt{{u_\Gamma}^2 - 2\mu g S_1} = \frac{8m}{s}.$

$\overrightarrow{p_A} = \overrightarrow{p_T} \Longrightarrow m_1u_1 - m_2u_2 = m_1u_1' + m_2u_2' (1)$

$K_a = K_T \Longrightarrow \frac{1}{2}m_1{u_1}^2 + \frac{1}{2}m_2{u_2}^2 = \frac{1}{2}m_1{u_1}'^2 + \frac{1}{2}m_2{u_2}'^2. (2)$

Από (1), (2) έχουμε

${u_1}' = -10\frac{m}{s}$ $\quad και \quad$ ${u_2}' = 2\frac{m}{s}$

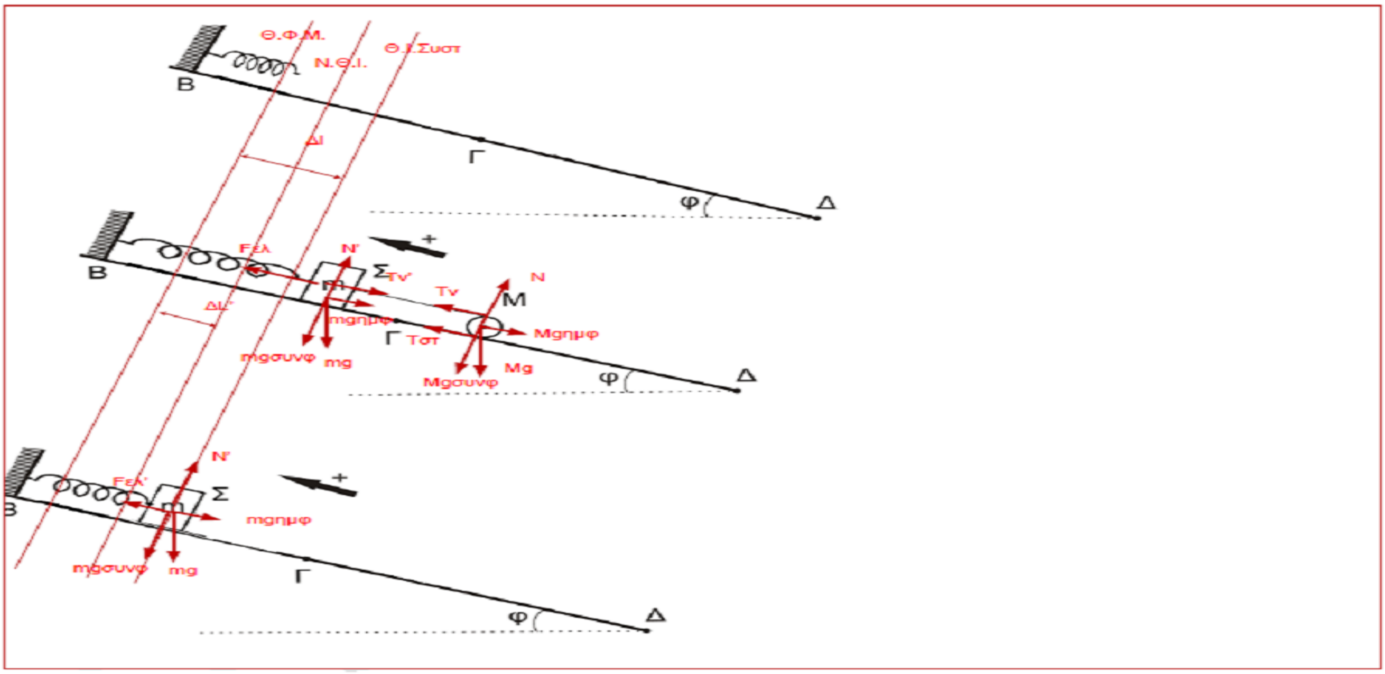
Γ3.

$\overrightarrow{\Delta P} = \overrightarrow{{P_2}'} - \overrightarrow{P_2} \Longrightarrow \Delta P_2 = m_2u_2' + m_2u_2 = 18\ \frac{kg \cdot m}{s}$ $(με\ φορά\ προς\ τα\ δεξιά).$

Γ4.

$\frac{|K_1' - K_1|}{K_1} \cdot 100\% = \frac{\left|\frac{1}{2}m_1{u_1}'^2 - \frac{1}{2}m_1{u_1}^2\right|}{\frac{1}{2}m_1{u_1}^2} \cdot 100\% = \frac{225}{4}\% = 56{,}25\%.$

**Θέμα Δ**




Δ1.$Για\ τον\ κύλινδρο:\ \Sigma\tau = 0 \Longrightarrow F_{\varepsilon\lambda}R = TR \Longrightarrow F_{\varepsilon\lambda} = T$

$$Για\ το\ σώμα\ \Sigma:\ \Sigma F = 0 \Longrightarrow mg\eta\mu\varphi + F'_{\varepsilon\lambda} = F_{\varepsilon\lambda} \Longrightarrow F_{\varepsilon\lambda} = 10N \Longrightarrow \Delta x = \frac{F_{\varepsilon\lambda}}{k} = 0{,}1m.$$

Δ2.

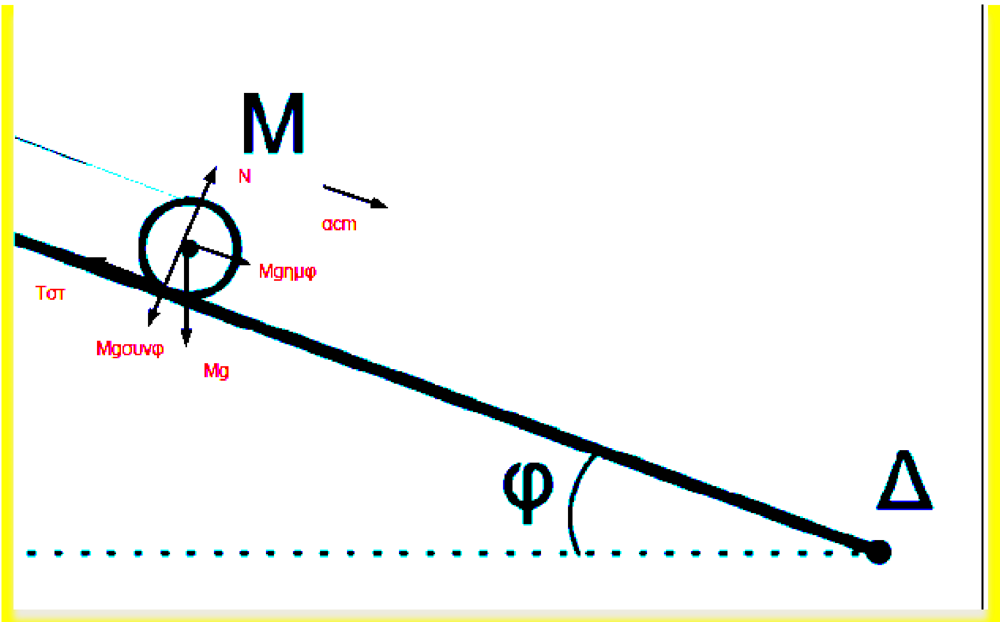
$k = m\omega^2 \Longrightarrow \omega = 10rad/s$

Για t=0 έχω x=-A. άρα $\varphi_0 = \frac{3\pi}{2}\ rad.$

$\Sigma F = -Dx = -DA\eta\mu(\omega t + \varphi_0) \overset{(1)}{\Longrightarrow} \Sigma F = -5\eta\mu\left(10t + \frac{3\pi}{2}\right).(S.I.)$

$x_1 = \frac{mg\eta\mu\varphi}{k} = \frac{1}{20}m\,.\,άρα\ A = \Delta l - x_1 = \frac{1}{20}m.$

Δ3.




$\theta = N \cdot 2\pi = 24\, rad.$

$\Sigma F = Ma \Longrightarrow Mg\eta\mu\varphi - T = M\alpha\ (1)$

$\Sigma\tau = I\alpha_{\gamma\omega\nu} \Longrightarrow TR = \frac{1}{2}MR^2\frac{a}{R}\ (2)$

Από (1) και (2) έχουμε $a = \frac{10}{3}\frac{m}{s^2}$ $.\,o\pi\acute{o}\tau\varepsilon\ \ \alpha_{\gamma\omega\nu} = \frac{\alpha}{R} = \frac{100}{3}\frac{rad}{s^2}$

$\theta = \frac{1}{2}\alpha_\gamma t^2 \Longrightarrow 24 = \frac{1}{2}\frac{100}{3}t^2 \Longrightarrow t = 1{,}2\, sec$

$\omega = \alpha_\gamma t = 40\frac{rad}{s}$

$L = I\omega = \frac{1}{2}mR^2\omega = 0{,}4\ \frac{kg \cdot m^2}{s}$

Δ4.

$$\frac{dK}{dt} = \left(\frac{dK}{dt}\right)_{\mu\varepsilon\tau} + \left(\frac{dK}{dt}\right)_{\pi\varepsilon\rho} = \Sigma F \cdot u + \Sigma\tau \cdot \omega = \frac{3}{2}M \cdot \alpha \cdot \upsilon = \frac{3}{2}M \cdot \alpha^2 \cdot t = 100\ \frac{J}{s}.$$

**Ομάδα Φυσικών «Άλμα»**

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