ΛΥΣΕΙΣ Β' ΛΥΚΕΙΟΥ

ΘΕΜΑ Α : $A_1.\gamma$ $A_2.\delta$ $A_3.\gamma$ $A_4.\beta$ $A_5.$ Σ, Λ, Λ, Σ, Σ

ΘΕΜΑ Β :

$B_1.\ \gamma$

ΑΔΟ : $2mv_1 - mv_2 = 0 \rightarrow v_2 = 2v_1$

$$\boxed{Q} = K_{\tau\epsilon\lambda} - \cancel{K_{\alpha\rho\chi}}^{0} = \frac{1}{2}\cdot 2m v_1^2 + \frac{1}{2} m\, 4v_1^2 = K + 2K = \boxed{3K}$$

$B_2.\ \beta$

$\odot\ \Sigma\tau_{(A)} = 0 \rightarrow w\cdot \frac{l}{2}\cancel{\eta\mu}60^\circ = T\cdot l\cancel{\sigma\upsilon\nu}60^\circ \rightarrow T = \frac{\sqrt{3}}{2} w$

$\odot\ F_{Ax} = T = \frac{\sqrt{3}}{2} w$

$\odot\ F_{Ay} = w$

$\Rightarrow \boxed{F_A} = \sqrt{F_{Ax}^2 + F_{Ay}^2} = \boxed{\frac{\sqrt{7}}{2} w}$

$B_3.\ \beta$

$F_{\epsilon\lambda} = w \rightarrow k\Delta l = mg$

$\Sigma\tau = 0 \rightarrow F_{\epsilon\lambda}'(l - x) = w\left(\frac{l}{2} - x\right) \rightarrow \frac{k\Delta l}{3}(l - x) = 2\cancel{mg}\left(\frac{l}{2} - x\right) \rightarrow$

$$\rightarrow \frac{l - x}{3} = l - 2x \rightarrow \frac{l}{3} - \frac{x}{3} = l - 2x \rightarrow$$

$$2x - \frac{x}{3} = \frac{2l}{3} \rightarrow \frac{5x}{3} = \frac{2l}{3} \rightarrow \boxed{x = \frac{2}{5} l}$$

Θεμα Γ:

Θ.Ι: $\Delta l = \frac{mg}{k} = 0,2m$ κ' $v = \sqrt{2gh} = 2\sqrt{3}\ m/s$

Γ1. $mv = 2mV_c \rightarrow \boxed{V_c = \sqrt{3}\ m/s}$

Γ2. $\boxed{Q} = K_{\alpha\rho\chi} - K_{\tau\epsilon\lambda} = \frac{1}{2}mv^2 - \frac{1}{2}2mV_c^2 = \frac{1}{2}\cdot 12 - \frac{1}{2}\cdot 2\cdot 3 = \boxed{3J}$

Γ3. ΘΜΚΕ: $K_{\tau\epsilon\lambda} - K_{\alpha\rho\chi} = W_w + W_{F_{\epsilon\lambda}} \rightarrow$

$$-\frac{1}{2}2mV_c^2 = 2mgy + \frac{1}{2}k\Delta l^2 - \frac{1}{2}k(\Delta l + y)^2 \rightarrow \boxed{y = 0,6m}$$

Γ4. $\left|\frac{dp}{dt}\right| = \Sigma F = W_{o\lambda} - F_{\epsilon\lambda} = 20 - 10 = 10N$

κ' $\left|\frac{dK}{dt}\right| = \Sigma f \cdot V_c = 10\sqrt{3}\ J/s$

Θεμα Δ:

Δ1. $\Sigma_{\Sigma 2} = 0 \rightarrow T \cdot \frac{3\ell}{4_2} = Mg\frac{\ell}{2} \rightarrow \boxed{T = 20N}$ κ' $\boxed{F = 10N}$

Δ2. $\Sigma_{\Sigma 2}' = 0 \rightarrow T' \cdot \ell + F' \cdot x = w\frac{\ell}{2}$

$T' + F' = Mg \rightarrow \frac{5}{5}F' = 30^{5} \rightarrow F' = 25N$

$T' = 5N$

$\Big\} \Rightarrow \boxed{x = 1,6m}$

Δ3. $\Sigma_{\Sigma(\tau)} = 0 \rightarrow T_{\Theta\Theta} \cdot \ell = w\frac{\ell}{2} + mg \cdot x \rightarrow \boxed{x = 3m}$

Δ4. $\Sigma_{\Sigma(\alpha)} = 0 \rightarrow w\frac{\ell}{2} + mg(\ell - x) = F \cdot \ell \rightarrow 60 + 40(\ell - x) = 4F \rightarrow$

$\boxed{F = 55 - 10x}$ (SI)