



ΘΕΜΑ Α:

A<sub>1</sub>. δ A<sub>2</sub>. γ A<sub>3</sub>. γ A<sub>4</sub>. β A<sub>5</sub>. Λ, Λ, Ι, Λ, Ι

ΘΕΜΑ Β:

B<sub>1</sub>. δ

$$\left. \begin{aligned} \alpha_A &= \omega^2 \cdot \frac{2l}{3} \\ \alpha_r &= \omega^2 \cdot l \end{aligned} \right\} \Rightarrow \frac{\alpha_A}{\alpha_r} = \frac{2}{3} \rightarrow \alpha_r = \frac{3}{2} \alpha_A$$

B<sub>2</sub>. γ

$$\text{Α.Δ.Ε: } K_m = K_m' + K_H' + Q \rightarrow$$

$$K_m - K_m' = K_H' + Q \rightarrow$$

$$K_m - K_m' = 250 \text{ J}$$

B<sub>3</sub>. γ

$$\left. \begin{aligned} y &= \frac{1}{2} g \frac{x^2}{v_0^2} \\ y &= \frac{1}{500} x^2 \end{aligned} \right\} \Rightarrow v_0 = 50 \text{ m/s}$$

ΘΕΜΑ Γ:

$$\Gamma_1. \text{ Α. Δ. Ο: } m v_1 = m v_2 + M V \rightarrow \boxed{V = 10 \text{ m/s}}$$

$$\Gamma_2. \boxed{17\%} = \frac{K_H'}{K_m} \cdot 100\% = \frac{\frac{1}{2} M V^2}{\frac{1}{2} m v_1^2} \cdot 100\% = \boxed{5\%}$$

$$\Gamma_3. \vec{I} F_m = \frac{\Delta \vec{P}_m}{\Delta t} \rightarrow I F_m = \frac{m v_2 - m v_1}{\Delta t} = -2000 \text{ N}$$

$(I F_m = 2000 \text{ N} \leftarrow)$

## Παρατηρήσεις

$$\Gamma_4. \text{ 2 ΜΚΕ / : } K_T - K_0 = W_w + W_{\cancel{w}} + W_T \rightarrow$$

$$M \quad -\frac{1}{2} M V^2 = -\mu M g \cdot x_{st} \rightarrow$$

$$x_{st} = 10 \text{ m}$$

$$\Gamma_5. Q_{on} = Q_{kp} + Q_{TP}$$

$$Q_{kp} = K_{\text{αρχ}} - K_{\text{τελ}} = \underline{1400 \text{ J}}$$

$$Q_{TP} = |W_T| = \underline{100 \text{ J}}$$

$$Q_{on} = 1500 \text{ J}$$

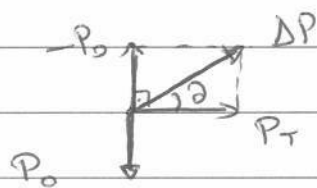
ΠΡΟΒΛΗΜΑ Δ :

$$\Delta_1. \text{ 2 ΜΚΕ / } K_T - K_0 = W_w + W_T \rightarrow$$

$$\frac{1}{2} m V^2 - \frac{1}{2} m v_0^2 = +mgl \rightarrow l = 0,8 \text{ m}$$

$$\Delta_2. \Sigma F = m \frac{v^2}{l} \rightarrow T - mg = m \frac{v^2}{l} \rightarrow T = 82,5 \text{ N}$$

$$\Delta_3. \Delta \vec{P} = \vec{P}_T - \vec{P}_0 = \vec{P}_T + (-\vec{P}_0)$$



$$|\Delta P| = \sqrt{P_0^2 + P_T^2} = \sqrt{136} \text{ kg m/s}$$

$$\cos \phi = \frac{|P_0|}{P_T} = \frac{6}{10} = 0,6$$

$$\Delta_4. \text{ 2 ΜΚΕ / } K_T - K_0 = W_w \rightarrow \frac{1}{2} m v^2 = mgh$$

$$\rightarrow v = \sqrt{2gl \cos \phi}$$

$$\Sigma F = m \frac{v^2}{l} \rightarrow T_{\text{top}} - mg \cos \phi = m \frac{v^2}{l}$$

$$\Rightarrow T_{\text{top}} = mg \cos \phi + m \frac{2gl \cos \phi}{l} \rightarrow \cos \phi = \frac{1}{2} \rightarrow \phi = 60^\circ$$