

ΓΕΛ ΚΑΡΕΑ

Β' ΛΥΚΕΙΟΥ
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ΘΕΜΑ Α : α β β γ
ΑΣ: Λ Λ Λ Σ Λ

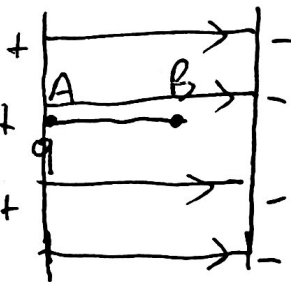
ΘΕΜΑ Β : β1 R, U, α_K α_K = $\frac{U^2}{R}$ (1)

R' = 2R, U' = 2U α_K' = ; α_K' = $\frac{U'^2}{R'}$ (2)

$$\frac{(2)}{(1)} \Rightarrow \frac{\alpha_K'}{\alpha_K} = \frac{\frac{U'^2}{R'}}{\frac{U^2}{R}} \Rightarrow \frac{\alpha_K'}{\alpha_K} = \frac{(2U)^2 \cdot R}{U^2 \cdot 2R} \Rightarrow \frac{\alpha_K'}{\alpha_K} = \frac{4U^2 R}{2 \cdot 2R} = 2 \Rightarrow \alpha_K' = 2\alpha_K \quad (\text{β})$$

β2)

p: q_p = +e, m_p = m, U_p



α: q_α = +2e, m_α = 4m, U_α

p: ΘΜΚΕ_{A→B} : $\frac{1}{2} m U_p^2 - 0 = e \cdot V_{AB}$ (1)

α: ΘΜΚΕ_{A→B} : $\frac{1}{2} 4m U_\alpha^2 - 0 = 2e \cdot V_{AB}$ (2)

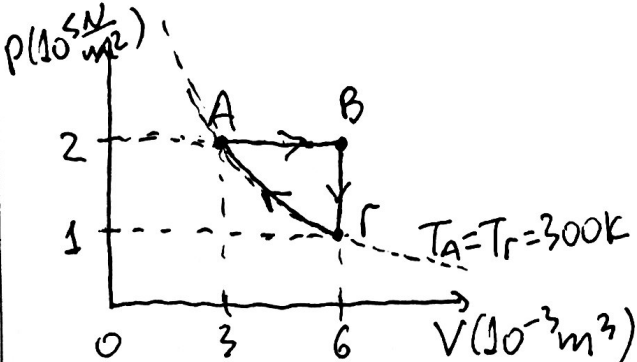
$$\frac{(2)}{(1)} \Rightarrow \frac{\frac{1}{2} 4m U_\alpha^2}{\frac{1}{2} m U_p^2} = \frac{2e V_{AB}}{e V_{AB}} \Rightarrow \frac{U_\alpha^2}{U_p^2} = \frac{1}{2} \Rightarrow \frac{U_p^2}{U_\alpha^2} = 2 \Rightarrow \frac{U_p}{U_\alpha} = \sqrt{2}$$

(α)

ΘΕΜΑ Γ : n = $\frac{2}{R}$ mol

P_A · V_A = n R T_A ⇒ 2 · 10⁵ · V_A = $\frac{2}{R} \cdot R \cdot 300$ ⇒
⇒ V_A = 3 · 10⁻³ m³

	A	B	Γ	A
P ($\frac{SN}{m^2}$)	2 → 2	2	1	2
V (m ³)	V _A = 3	V _B = 2V _A = 6	V _Γ = 2V _A = 6	V _A = 3
T (K)	300	600	300 → 300	



Γ3: W_{ολ} = W_{AB} + W_{BΓ} + W_{ΓA} ⇒ W_{ολ} = P_A · (V_B - V_A) + n R T_A · ln $\frac{V_A}{V_\Gamma}$
 ⇒ W_{ολ} = 2 · 10⁵ · (6 - 3) · 10⁻³ + $\frac{2}{R} \cdot R \cdot 300 \cdot \ln \frac{3 \cdot 10^{-3}}{6 \cdot 10^{-3}}$ ⇒
 ⇒ W_{ολ} = 600 - 600 ln 2 ⇒ W_{ολ} = 600 - 600 · 0,7 ⇒
 ⇒ W_{ολ} = 600 - 420 ⇒ W_{ολ} = 180 J

ΘΕΜΑ Δ :

$$M = 2 \text{ kg}$$

$$U_2 = 0$$

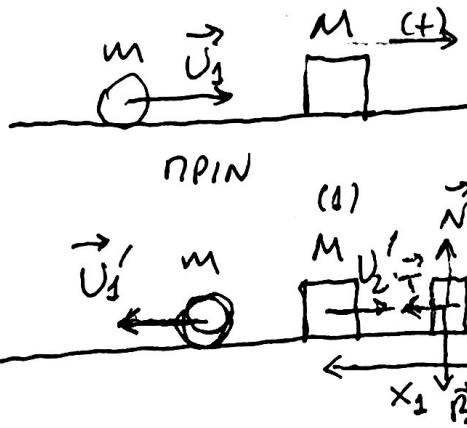
$$\mu = 0,2$$

$$m = 0,1 \text{ kg}$$

$$U_1 = 100 \text{ m/s}$$

$$U_1' = 20 \text{ m/s}$$

$$\Delta t = 0,1 \text{ s}$$



$$\Delta 1) U_2' = ;$$

ΑΔΟ:

$$\vec{P}_{02, \text{αρχ}} = \vec{P}_{02, \text{τελ}} \Rightarrow$$

$$\Rightarrow m U_1 = -m U_1' + M \cdot U_2' \Rightarrow$$

$$\Rightarrow M \cdot U_2' = m(U_1 + U_1') \Rightarrow$$

$$\Rightarrow U_2' = \frac{m}{M} (U_1 + U_1') \Rightarrow$$

$$\Rightarrow U_2' = \frac{0,1}{2} (100 + 20) \Rightarrow$$

$$\Rightarrow U_2' = \frac{0,1}{2} \cdot 120 \Rightarrow U_2' = 6 \frac{\text{m}}{\text{s}}$$

$$\Delta 2) \vec{F}_m = \frac{\Delta \vec{P}_m}{\Delta t} \Rightarrow$$

$$\Rightarrow \vec{F}_m = \frac{\vec{P}_{m, \text{τελ}} - \vec{P}_{m, \text{αρχ}}}{\Delta t} \Rightarrow F_m = \frac{-m U_1' - m \cdot U_1}{\Delta t} \Rightarrow F_m = - \frac{m(U_1' + U_1)}{\Delta t} \Rightarrow$$

$$\Rightarrow F_m = - \frac{0,1 \cdot (20 + 100)}{0,1} \Rightarrow F_m = -120 \text{ N}$$

$$\Delta 3) \eta \% = \frac{K_{m, \text{τελ}}}{K_{m, \text{αρχ}}} 100\% \Rightarrow \eta \% = \frac{\frac{1}{2} M \cdot U_2'^2}{\frac{1}{2} m \cdot U_1^2} 100\% \Rightarrow \eta \% = \frac{2 \cdot 6^2}{0,1 \cdot 10^4} 10^2\% \Rightarrow$$

$$\Rightarrow \eta \% = \frac{72}{10} \% \Rightarrow \eta \% = 7,2\%$$

$$\Delta 4) \theta \text{ΜΚΕ}_{M(1) \rightarrow (2)} : K_{\text{τελ}} - K_{\text{αρχ}} = \Sigma W_f \Rightarrow 0 - \frac{1}{2} M U_2'^2 = W_f \Rightarrow$$

$$\Rightarrow W_f = - \frac{1}{2} \cdot 2 \cdot 6^2 \Rightarrow W_f = -36 \text{ J}$$

$$Q = |W_f| = 36 \text{ J}$$