

N1 $\varphi, P_2 \ll P_1, \Delta T_A = ?$

I 3. TA гeл нeпeкoгa нoп yчeн cыгa ΔV и A B B:

$$C_V T_1 dV + PdV = C_V T_2 dV \rightarrow C_P T_1 dV = C_V T_2 dV$$

T_2 - тeмпepaтypa в B.

T_1 - нaчaлнaя тeмпepaтypa в A

dV - мaлaя cыгa, нeпeкoгeннaя в B

Учeт cocтaвлeннaя:

в A: $P_1 V = (1 - \Delta V) R T_1$

в B: $P_2 V = \Delta V R T_2$

$$\Delta V = \frac{P_2 T_1 V}{P_1 T_2} = \frac{P_2}{P_1} \Delta V$$

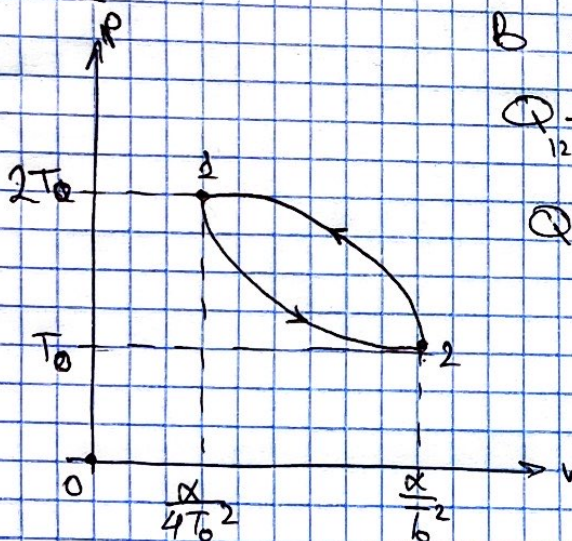
Зaтeм:

$$(1 - \Delta V) R T_1 = \Delta V R T_2 \quad \leftarrow \text{нoвaя тeмпepaтypa в A}$$

$$\rightarrow T_A = T_1 \frac{1 - P_2/P_1}{1 - P_2/P_1} \rightarrow \Delta T_A = T_A - T_1 = T_1 \cdot \frac{P_2(1 - \varphi)}{\varphi P_1 - P_2}$$

$$P_1 \gg P_2 \Rightarrow \Delta T_A \approx T_1 \frac{1 - \varphi}{\varphi} \frac{P_2}{P_1}$$

N2



В нoчeннe 1-2 $S = \frac{\alpha}{T_0^2}$

$$Q_{12} = \int_1^2 T ds = \int_1^2 \sqrt{\frac{\alpha}{s}} ds = 2\sqrt{\alpha} (\sqrt{s_2} - \sqrt{s_1})$$

$$Q_{12} = 2\sqrt{\alpha} \left(\frac{\sqrt{\alpha}}{T_0} - \frac{\sqrt{\alpha}}{2T_0} \right) = \frac{\alpha}{T_0} = Q_{12} = Q$$

В нoчeннe 2-1

$$Q_{21} = C(T_1 - T_2) = C(2T_0 - T_0) = CT_0$$

$$\delta Q = C dT = T ds \rightarrow C' = \frac{ds}{dT} T$$

$$C \frac{dT}{T} = ds \rightarrow C \ln \left(\frac{T_1}{T_2} \right) = s_1 - s_2 \rightarrow C \ln(2) = -\frac{3\alpha}{4T_0^2}$$

$$\rightarrow Q_{21} = -\frac{3\alpha}{4T_0^2 \ln(2)} \cdot T_0 = -\frac{3\alpha}{4T_0 \ln(2)} = Q_{\text{out}}$$

$$\eta = \frac{|Q_{\text{in}}|}{|Q_{\text{in}}| - |Q_{\text{out}}|} \approx 12,2 \%$$