

$$P_1 = 1.8 \cdot 10^5 \text{ Pa} \quad V_A = 0.02 \text{ m}^3$$

$$n = 1, \text{ mono} \quad T_0 = 300 \text{ K}$$

$$T_S = 600 \text{ K}$$

$$T_2, V_B \quad \Delta S_{\text{gas}, O_2} = 15 \text{ J/K}$$

Q_{loss}

$$P_0 = \frac{n R T_0}{V_A}$$

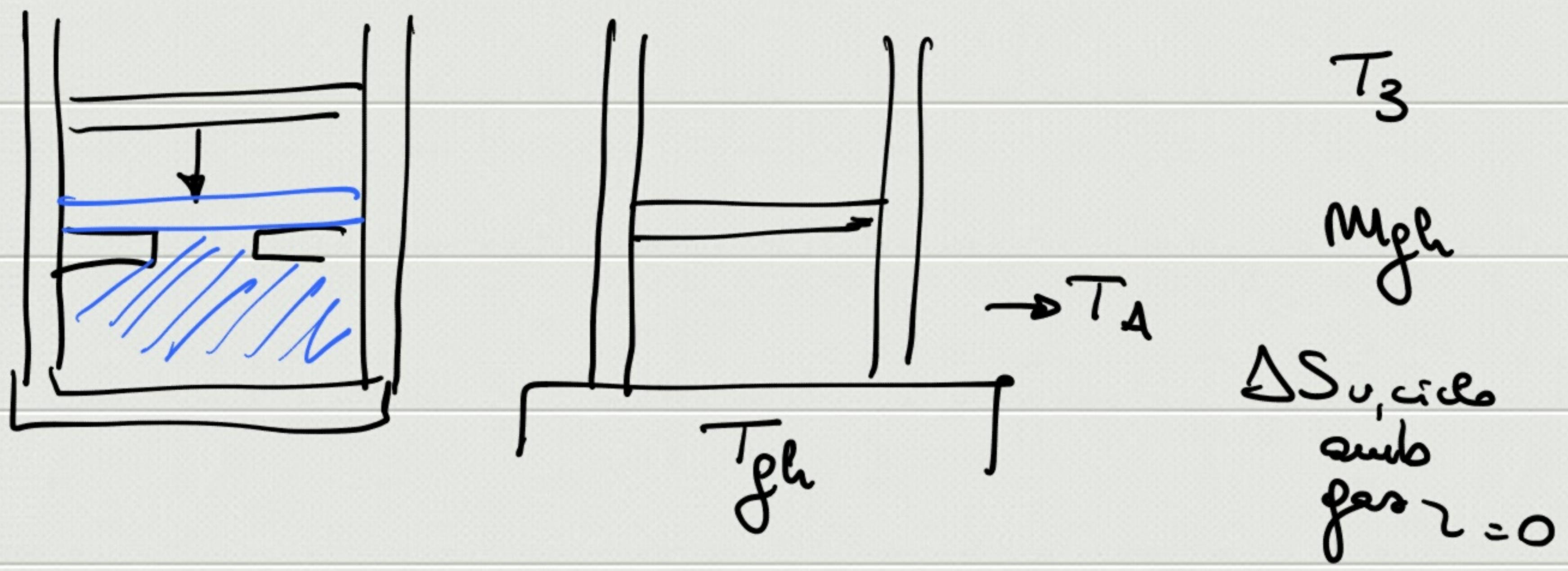
$$T_2 = T_1$$

$$P_1 V_A = n R T_1 \Rightarrow T_1 = \frac{P_1 V_A}{n R} = 433 \text{ K} (= T_2)$$

$$\Delta S_{\text{gas}, O_2} = n R \ln \frac{V_A + V_B}{V_A} + n c_V \ln \frac{T_1}{T_0}$$

$$\Rightarrow V_B = 0.05 \text{ m}^3$$

$$Q_{\text{loss}} = Q_{01} = n c_V (T_1 - T_0) = 1659 \text{ J}$$

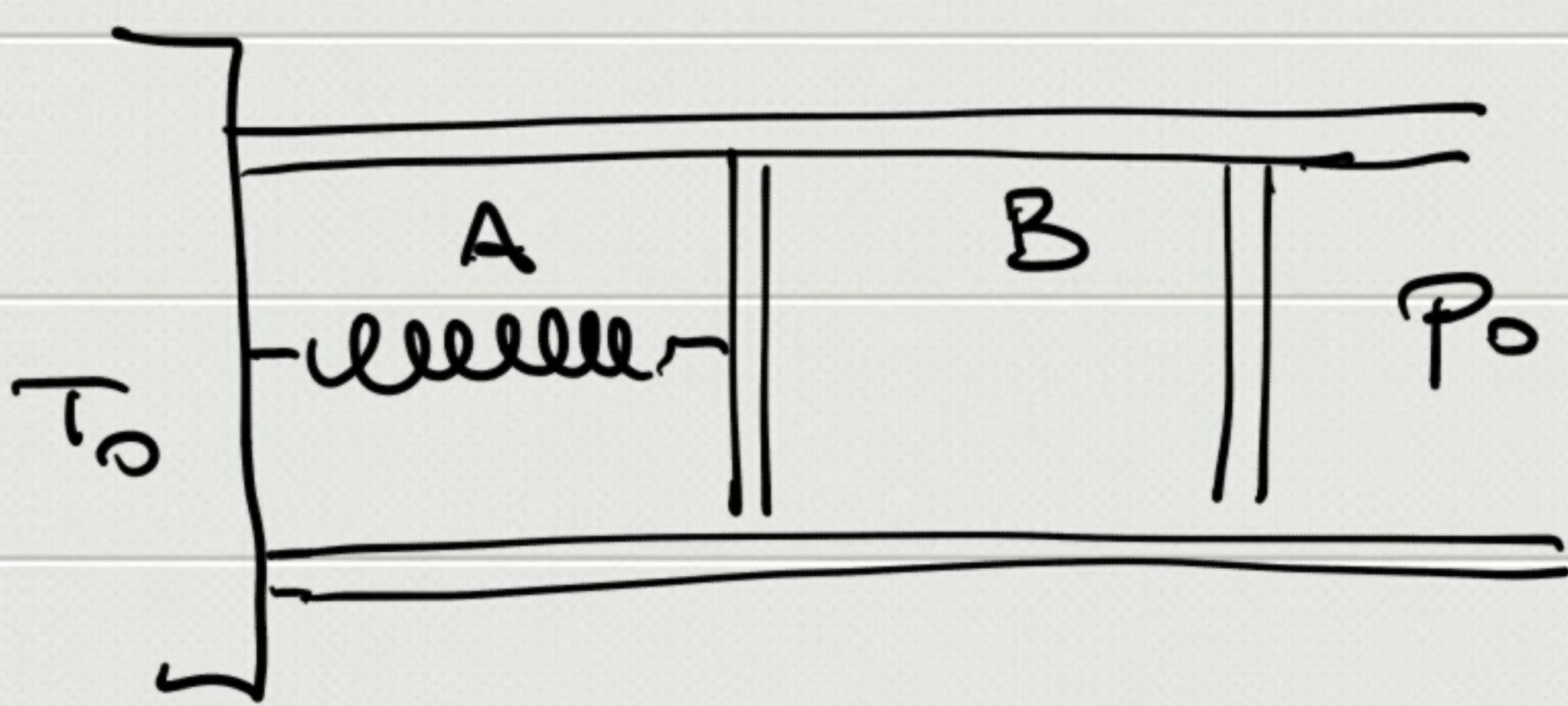


$$T_1 (V_A + V_B)^{r-1} = T_3 V_A^{r-1} \Rightarrow T_3 = T_1 \left(1 + \frac{V_B}{V_A}\right)^{r-1} = 998 \text{ K}$$

$$Q_{\text{ges},30} = n_C w (T_0 - T_3) < 0 \Rightarrow Q_{\text{ghi}} = -Q_{\text{ges},30} \\ = m_{\text{ghi}} \Delta_{\text{ghi}}$$

$$\Rightarrow m_{\text{ghi}} = -\frac{Q_{\text{ges},30}}{\Delta_{\text{ghi}}} = 0.026 \text{ kg}$$

$$\Delta S_{\text{v,circ}} = \Delta S_{\text{v,01+30}} = \frac{-Q_{\text{ges},01}}{T_S} + \frac{m_{\text{ghi}} \Delta_{\text{ghi}}}{T_{\text{ghi}}} = \\ = 29.1 \text{ J/K}$$



$$m = 0.5, m_{\text{mono}}$$

$$k = 7500 \text{ N/m}$$

$$l_0$$

$$T_0 = 300 \text{ K}$$

$$T_{0A} = T_{0B} = T_0$$

$$P_0 = 10^5 \text{ Pa}$$

$$S = 0.025 \text{ m}^2$$

$$l = \frac{l_0}{2} \Rightarrow V_A = \frac{V_{0A}}{2}$$

$$l_0, T_B, W_{\text{ext}}$$

$$P_{B0} = P_0 = P_{A0}$$

$$\Rightarrow V_{0A} = \frac{m R T_0}{P_0} = 0.0123 \text{ m}^3$$

$$= S l_0$$

$$\Rightarrow l_0 = \frac{V_{0A}}{S} = 0.49 \text{ m}$$

$$P_A = \frac{m R T_0}{V_A} = 2P_0$$

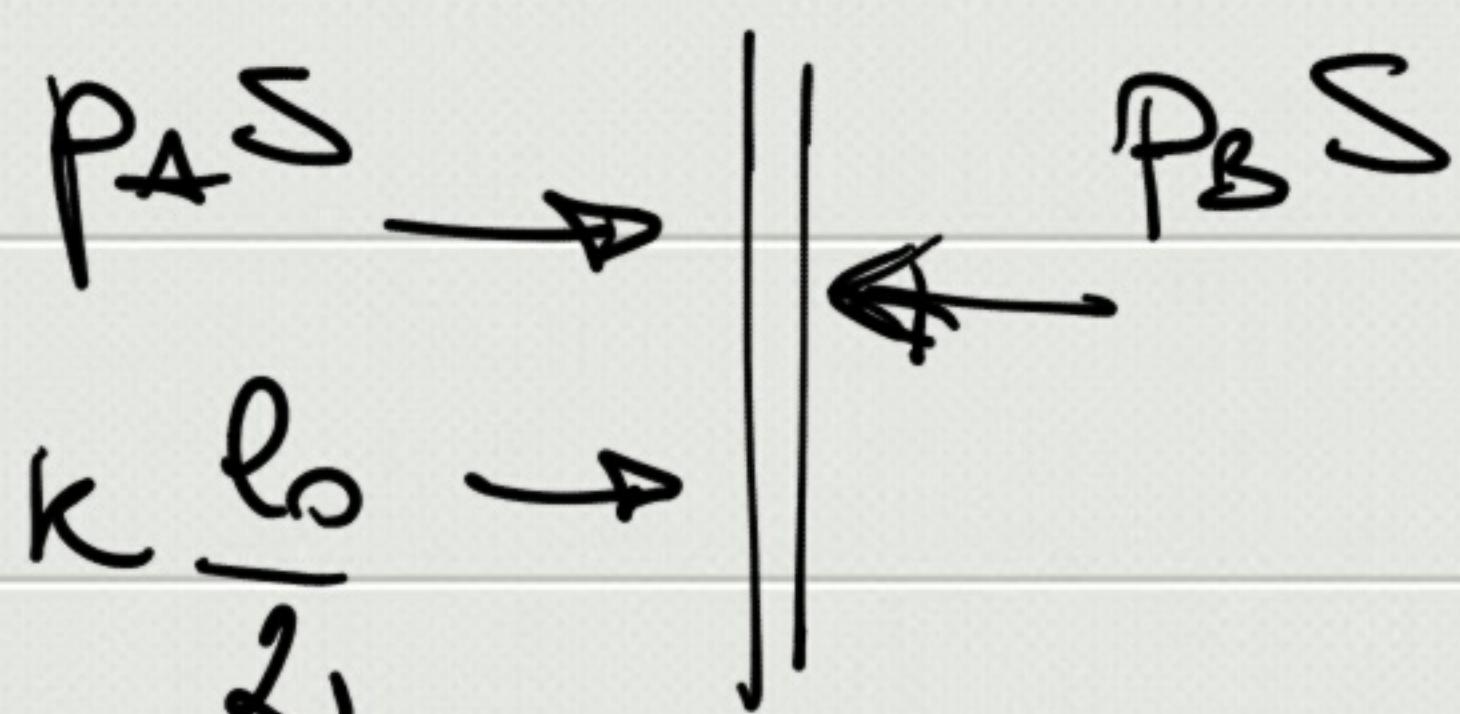
$$|\Delta l| = \left| l_0 - \frac{l_0}{2} \right| = \frac{l_0}{2}$$

$$P_B = P_0$$

$$= 2P_0$$

$$= 2P_0 + \frac{k l_0 / 2}{S} *$$

$$= P_0 + \frac{k l_0 / 2}{S}$$



$$P_A S + k \frac{l_0}{2} - P_B S = 0$$

$$\Rightarrow P_B = P_A + \frac{k l_0 / 2}{S}$$

$$\frac{T_0 p_0}{T_B p_B} = \left(\frac{p_0}{p_B}\right)^{\frac{1-\gamma}{\gamma}} \Rightarrow T_B = T_0 \left(\frac{p_0}{p_B}\right)^{\frac{1-\gamma}{\gamma}} = 448 \text{ K}$$

$$W_{\text{ext}} = -W_{\text{mole}}$$

$$= -W_{\text{gas}, A} - W_{\text{gas}, B}$$

$$= p_0 (2V_0 - V_A - V_B)$$

$$= -W_{\text{gas}, A} - W_{\text{gas}, B} - W_{\text{mole}} *$$

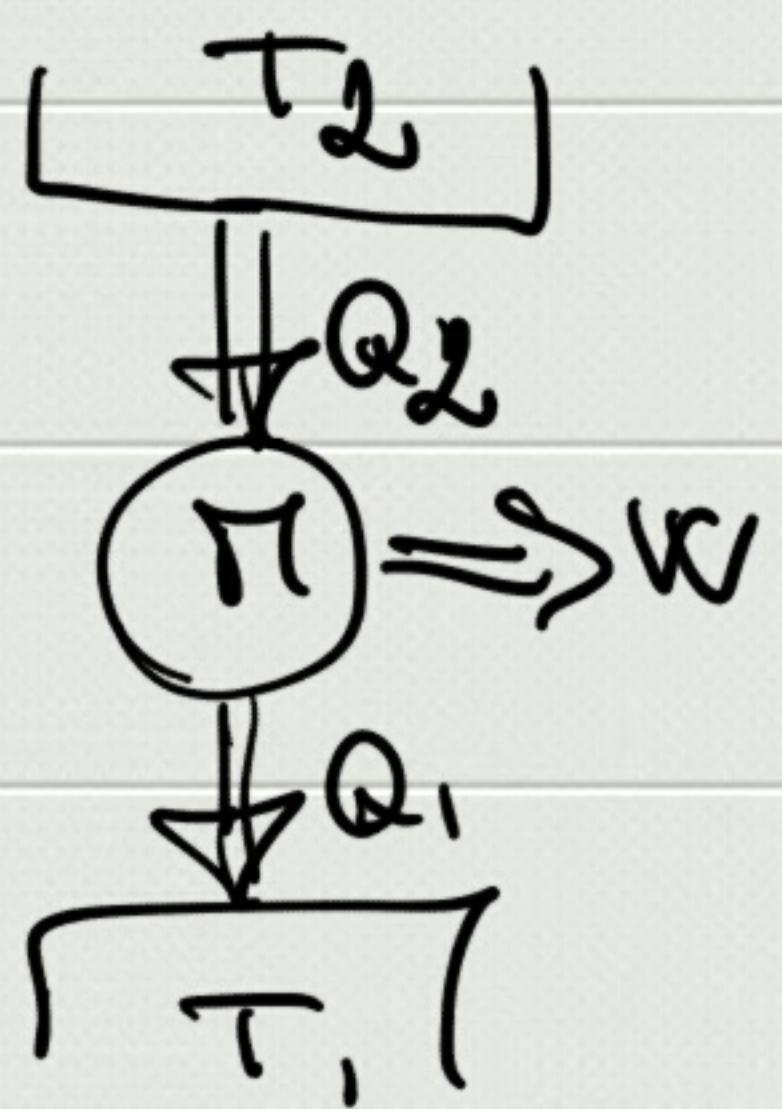
$$W_{\text{ext}} = -W_{\text{int}}$$

$$W_{\text{gas}, A} = \mu R T_0 \ln \frac{V_A}{V_{0A}} = -864.4 \text{ J}$$

$$W_{\text{gas}, B} = -\Delta U_B = -\mu c_v (T_B - T_0) = -923.3 \text{ J}$$

$$W_{\text{mole}} = -\Delta E_{\text{pot, el}} = -\frac{1}{2} \kappa \Delta r^3 \rightarrow \frac{l_0}{2} = 227 \text{ J}$$

$$\Rightarrow W_{\text{ext}} = 2013 \text{ J}$$



$$T_2 = 600 \text{ K}$$

$$T_1 = 290 \text{ K}$$

$$Q_2 = 6.5 \cdot 10^4 \text{ J}$$

$W_{\text{ges}} \Rightarrow$ compr. adiab. wr.

$$n=4 \text{ mono} \quad T_A = 300 \text{ K} \quad V_A = 0.1 \text{ m}^3$$

$$V_B = 0.025 \text{ m}^3$$

$$\gamma = ? \quad E_{\text{IN}} = ?$$

$$\gamma = \frac{W}{Q_2}$$

$$\gamma = 1 + \frac{Q_1}{Q_2}$$

$$\gamma = \frac{m_C (T_B - T_A)}{Q_2}$$

$$\gamma = - \frac{m_C (T_B - T_A)}{Q_2}$$

$$\gamma = \frac{m R T_A Q_2 \ln V_B / V_A}{Q_2}$$

$$T_B = T_A \left(\frac{V_A}{V_B} \right)^{\gamma-1} \quad *$$

$$T_B = T_A \left(\frac{V_A}{V_B} \right)^{\gamma-1}$$

$$T_B = 756 \text{ K} \quad W_{\text{ges}} = -2.275 \cdot 10^4 \text{ J}$$

$$\Rightarrow \gamma = 0.35$$

$$E_{IN} = T_1 \left(-\frac{Q_1}{T_1} - \frac{Q_2}{T_2} \right) *$$

$$\stackrel{!}{=} 0$$

$$\stackrel{!}{=} m_R Q_2 - W *$$

$$\stackrel{!}{=} T_1 \left(\frac{Q_1}{T_1} + \frac{Q_2}{T_2} \right)$$

$$E_{IN} = T_{mine} \Delta S_0$$

$$Q_1 + Q_2 = W \Rightarrow Q_1 = W - Q_2 = -4.225 \cdot 10^4 J$$

$$E_{IN} = 1.085 \cdot 10^4 J$$