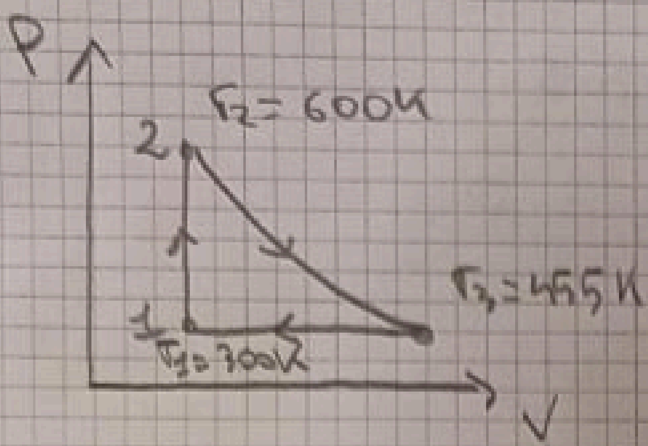


$c_p = \frac{5}{2}R = 20,8 \ J/mol\,K$

$c_v = \frac{3}{2}R = 12,5 \ J/mol\,K$

$n = 1$ Gas Ideale

1-2: Isocora

$L_{12} = 0$

$\Delta U_{12} = U_2 - U_1 = Q_{12}$ $\quad Q_{12} = n c_v \Delta T = 3742 \ J$

3-1: Isobara

$Q_{31} = n c_p \Delta T = -3222 \ J$

$\Delta U_{31} = U_1 - U_3 = n c_v \Delta T = -1933 \ J$

$L_{31} = Q_{31} - \Delta U_{31} = -1289 \ J$

2-3: Adiabatica

$Q_{23} = 0$

$\Delta U_{23} = U_3 - U_2 = -[U_2 - U_1] - [U_1 - U_3] = -1809 \ J$

perché il processo totale è un ciclo.

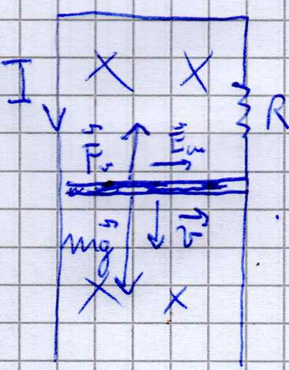
$L_{23} = Q_{23} - \Delta U_{23} = -\Delta U_{23} = 1809 \ J$

$$L_{Tot} = L_{12} + L_{23} + L_{31} = 520\ J$$

$$Q_{Tot} = Q_{12} + Q_{23} + Q_{31} = 520\ J$$

$$\Delta U_{Tot} = \Delta U_{12} + \Delta U_{23} + \Delta U_{31} = 0$$

Soluzione Esercizio 2 del 4/2/22



$$\vec{E}_m = \frac{\vec{F}}{q} = \vec{v} \times \vec{B}$$

$$f.e.m. = \oint_L \vec{E}_m \cdot d\vec{l} = vBL$$

$$I = \frac{f.e.m.}{R} = \frac{vBL}{R} \qquad \vec{F}_v = I\vec{L} \times \vec{B}$$

$$|\vec{F}_v| = \frac{B^2L^2}{R}v$$

velocità limite $mg = \frac{B^2L^2}{R} v_{lim}$

Eq. moto

$$-|F_v| + mg = m\frac{dv}{dt}$$

2a $\boxed{v_{lim} = \frac{mgR}{B^2L^2}}$

$$-\frac{B^2L^2}{R}v + mg = m\frac{dv}{dt}$$

$$mg - \frac{B^2L^2}{R}v = X \Rightarrow -\frac{B^2L^2}{R}dv = dX$$

$$\Rightarrow dv = -\frac{R}{B^2L^2}dX$$

Sostituendo

$$X = -\frac{mR}{B^2L^2}\frac{dX}{dt} \Rightarrow X = X_0 e^{-\frac{t}{\tau}} \qquad \text{con } \tau = \frac{mR}{B^2L^2}$$

$X_0 = mg$ se $v_0 = 0$

$$\Rightarrow mg - \frac{B^2L^2}{R}v = mg\, e^{-\frac{t}{\tau}} \Rightarrow \boxed{v(t) = \frac{mgR}{B^2L^2}\left(1 - e^{-\frac{t}{\tau}}\right)}$$

2b

2c La corrente scorre in senso antiorario per opporsi alla variazione del flusso, cioè dal momento che sta aumentando il flusso entrante, la corrente crea un flusso uscente (legge di Lenz)