(49) $\gamma = C_p/C_v = 7/5$ biatómico.

$\gamma = \frac{z+2}{z}$

$C_v + R = C_p$

$Q = \Delta U + W$

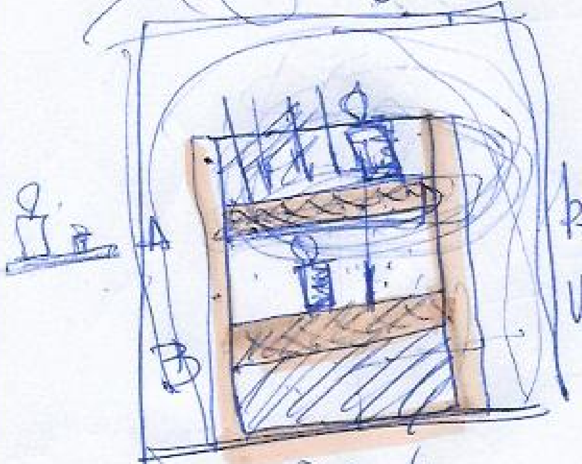
$\gamma = \frac{C_p}{C_v} = \frac{C_v + R}{C_v}$

$Q = \Delta U + W$ $= p\Delta V$

$\frac{z}{2} = \frac{1}{\gamma - 1}$

$C_v = \frac{z}{2} R$

$C_p = \frac{\frac{z}{2}R + R}{z/2 \cdot R}$



$p_A = 101325\ Pa$

$V_A = 100\ cm^3 = 10^{-4}\ m^3$ $\quad T_A = 293K$

$PV = nRT \Rightarrow n = \frac{P_A V_A}{nR} = 0{,}00416\ mol$

$p_B = (m_p + m_p)g/A$

$P_B = 2p_A$

$n_B = n_A = 0{,}00416\ mol$

$T_B = ? \neq T_A$

$V_B = ?$

$\cancel{p\gamma}$ = isoentrópico.

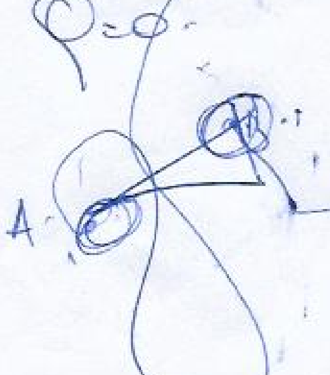
↳ $Q = 0$

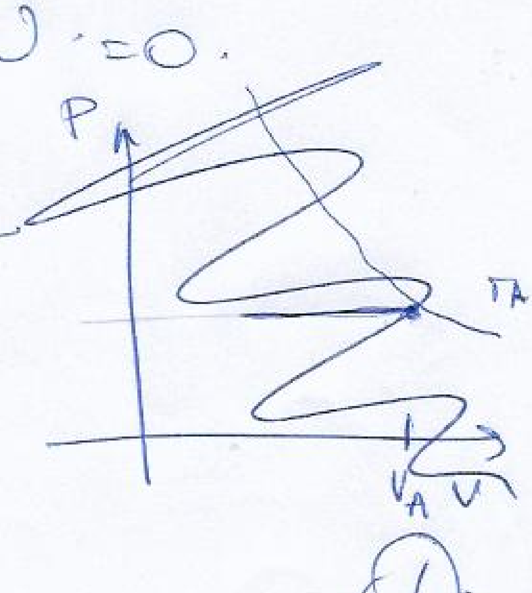
↳ reversible

$Q = 0$

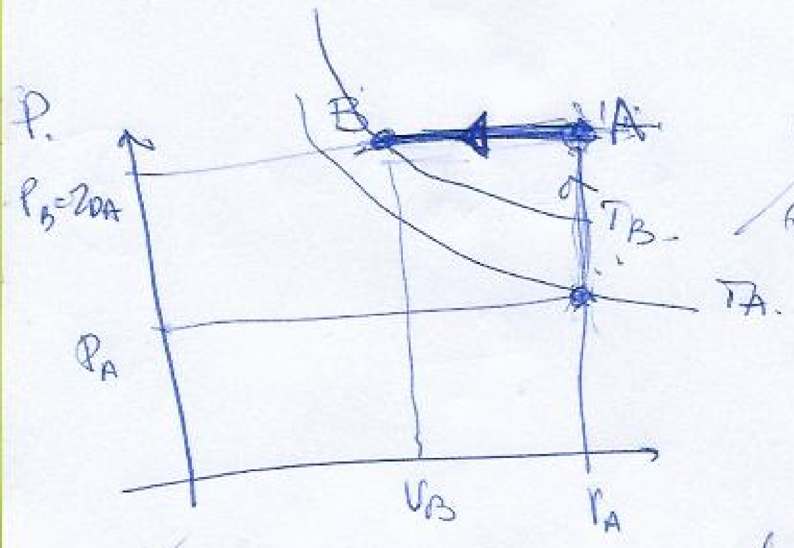
$Q = \Delta U + W = 0$

$\Delta U = -W$





(1)



$\cancel{Q} = \Delta U + \cancel{W} \Rightarrow \Delta U = 0$

0 0.

$W = p \cdot \Delta U = p_B \cdot (V_B - V_A)$

$\Delta U = C_v\, n\, \Delta T = \frac{5}{2} R n (T_B - T_A)$

$Q = \Delta U + W \rightarrow \Delta U = -W$ $\qquad PV = RTn$

$-\frac{5}{2} nR (T_B - T_A) = p_B (V_B - V_A)$

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

$-\left(\frac{1}{\gamma - 1}\right) (\underbrace{R T_B n - R T_A n}_{p_B V_B - p_A V_A}) = p_B (V_B - V_A)$

$$\boxed{-\left(\frac{1}{\gamma - 1}\right) (p_B \overset{?}{V_B} - p_A V_A) = p_B (\overset{?}{V_B} - V_A)}$$

$r = p_B / p_A$

2

$$V_B = V_A\left[\frac{p_B(\gamma-1)+p_A}{p_B\gamma}\right]$$

$$V_B = V_A\left(\frac{p_A}{p_B}\right)\left(\frac{(p_B/p_A)(\gamma-1)+1}{\gamma}\right)$$

$$\boxed{V_B = V_A\cdot\underbrace{\left(\frac{r(\gamma-1)+1}{\gamma r}\right)}_{9/14}}$$

$\gamma = 7/5$ $r=2$

$$V_B = \frac{9}{14}\cdot V_A = 64{,}3\ cm^3$$

$p_B,\ n_B \neq V_B \rightarrow T_B$

$$p_B V_B = p_A V_A\left(\frac{r(\gamma-1)+1}{\gamma}\right)$$

$\cancel{n}\cancel{R}T_B = \cancel{n}\cancel{R}T_A$

$$T_B = \frac{9}{7}\,T_A = 376{,}7\ K$$

Si fuera reversible

$$p_A V_A^{\gamma} = p_B V_B^{\gamma}$$

$$V_B^{\gamma} = \frac{p_A}{p_B}V_A^{\gamma}$$

$$V_B = \left(\frac{1}{r}\right)^{1/\gamma}V_A$$

$$V_B^{rev} = 60{,}95\ cm^3$$

$9/7$ Reversible

$$T_B^{rev} = 357K$$

3

$W = p \cdot \Delta V = -7{,}24\ J$

$\Delta S_U = \Delta S_{med} + \Delta S_{sist}$

≥ 0 $\quad \Delta S_{med} \to 0$

$\Delta S_{sis} = n C_p \ln\left(\frac{T_B}{T_A}\right) - nR\ln\left(P_B / P_A\right)$

$\Delta S_{sis} = +6{,}45\ mJ/K$

Reversible

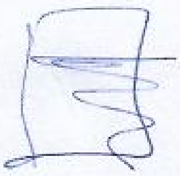
$W = p\,\Delta V^{rev} = -5{,}55\ J$

$\Delta S_U \geq 0$.

$\Delta S_{sis} = 0$.

$\Delta S_{med} = 0$.

$\Delta S_U = 0$.



$\frac{dQ}{dt} = \pm k\,A\,(T_c - T_f)$

"d" inversamente

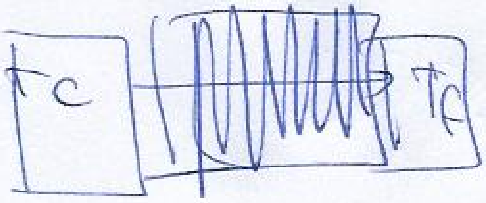
k material, k prop.

$\frac{dQ}{dt} \propto \pm \frac{A\,(T_c - T_f)}{d}$

$\frac{dQ}{dt} = \pm k \frac{A}{d} (T_c - T_f)$ Coef. de Conductividad térmica

material

$$\frac{dQ}{dt} \stackrel{def}{=} I_Q$$ Corriente térmica



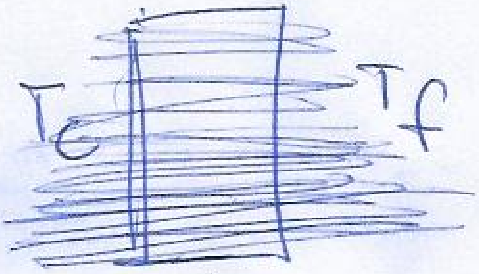
$$I_Q = K \frac{A}{d}(T_C - T_f)$$

$$[I_Q] = [K] \cdot \frac{[A]}{[d]} \cdot [T_C - T_f]$$

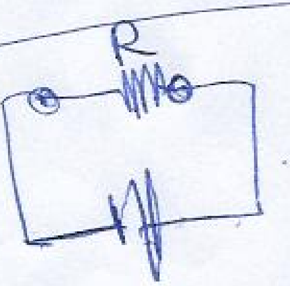
$$W$$

$$\frac{J}{s} = [K] \cdot \frac{m^{\cancel{2}}}{\cancel{m}} \cdot K$$

$$[K] = \frac{J\,W}{s\,m\,K} = \frac{W}{m\,K}$$



K.



$V = i\,R$.

Ley de Ohm

Electrones.

$$\frac{dQ}{dt} \stackrel{\text{"}}{=} I_Q = \left(K\frac{A}{d}\right)(T_C - T_f)$$

$$[K] = \frac{W}{m\,K}$$

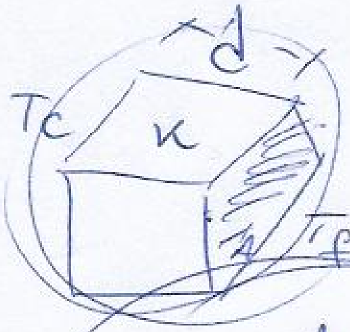
$$\frac{W}{m\,m} \cdot \frac{m\,K}{\cancel{m^2}}$$

$$I_Q = \left(\frac{KA}{d}\right)\Delta T$$

$$I_q = \underbrace{\left(\frac{kA}{d}\right)}_{\text{def } 1/R} \Delta T$$

R = resistencia térmica.

$$\boxed{\Delta T = I_q \cdot R}$$



$$I_q = \frac{\Delta T}{R}$$

$$R = \frac{d}{kA}$$