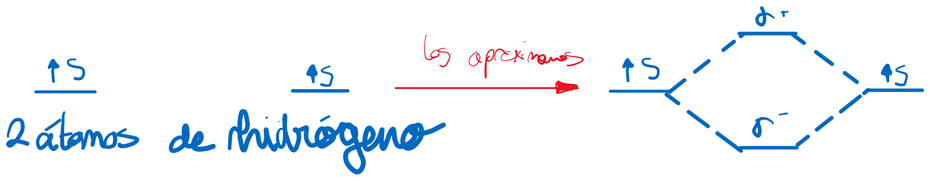
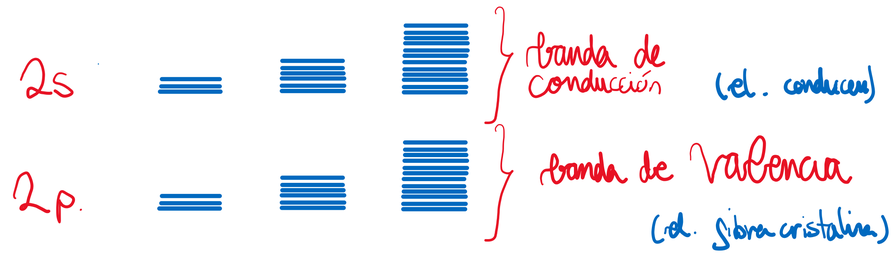
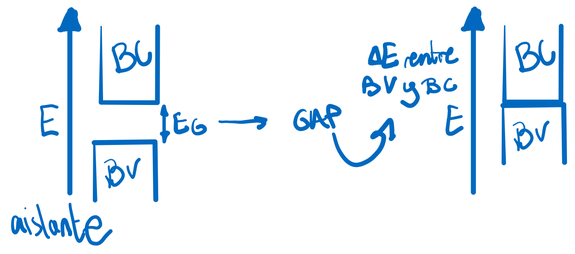
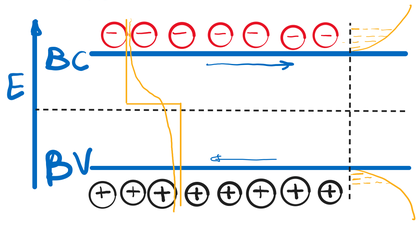




D1



Sc intrínseco



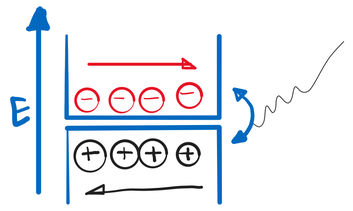
$$f_n(E) = \frac{1}{e^{(E-E_f)/KT}+1}$$ si $>3KT$ elimino el 3

$$N_c = 2\left(\frac{2\pi m_n kT}{h^2}\right)^{3/2} \Rightarrow n = N_c e^{-(E_c-E_f)/kT}$$

$$N_v = 2\left(\frac{2\pi m_p kT}{h^2}\right)^{3/2} \Rightarrow p = N_v e^{-(E_f-E_v)/kT}$$

$$E_F = \frac{E_c+E_v}{2}$$

Silicio y germanio



establecemos:

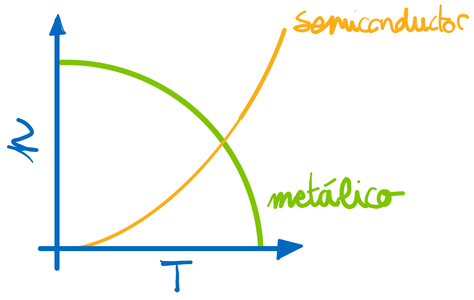
$e^- \rightarrow n$

$h^+ \rightarrow p$

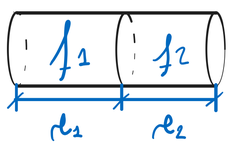
en sc intrínsecos: $n = p$

$$n \cdot p = n_i^2$$ ley de acción de masas

$$n_i = \sqrt{N_c N_v}\, e^{-\left(\frac{E_c-E_v}{2}\right)/kT}$$



P3)



$$f = f_0\left(1+\alpha(T-T_0)\right)$$

$f_{0,cu} = 1.7\cdot10^{-6}\ \Omega\,cm$, $\alpha_{Cu} = 3.93\,10^{-3}\ K^{-1}$

$f_{0,c} = 35\cdot10^{-3}\ \Omega\,cm$, $\alpha_c = -0.5\cdot10^{-3}\ K^{-1}$

$$R_c = \frac{f_c\ l_c}{S}, \quad R_{cu} = \frac{f_{cu}\ l_{cu}}{S}$$

$$R_T = R_{cu} + R_c$$

$$R_T = f_{0,cu}\left(1+\alpha_{cu}(T-T_0)\right)\frac{l_{cu}}{S} + f_{0,c}\left(1+\alpha_c(T-T_0)\right)\frac{l_c}{S}$$

$$\frac{dR}{dt} = 0 \longleftrightarrow f_{0,cu}\,\alpha_{cu}\frac{l_{cu}}{S} + f_{0,c}\,\alpha_c\frac{l_c}{S} = 0$$

$$\left[\frac{l_{cu}}{l_c} = -\frac{f_{0,c}\,\alpha_c}{f_{0,cu}\,\alpha_{cu}} = 262\right]$$