Equations and Constants

$\lambda_{max} T = 2.898 \times 10^{-3} mK$

$R(T) = \sigma T^4$ where $\sigma = 5.67 \times 10^{-8} W/(m^2 K^4)$

$I(\lambda, T) = \frac{2\pi c^2 h}{\lambda^5} \frac{1}{e^{hc/\lambda kT} - 1}$

$r_n = \frac{4\pi\epsilon n^2 \hbar^2}{me^2} = n^2 a_0$

$E_n = \frac{e^2}{8\pi\epsilon_0 r_n} = -\frac{E_0}{n^2}$

$\frac{1}{\lambda} = \frac{E_0}{hc}(\frac{1}{n_l^2} - \frac{1}{n_u^2}) = \frac{1}{\lambda} = R_\infty(\frac{1}{n_l^2} - \frac{1}{n_u^2})$

$b = \frac{Z_1 Z_2 e^2}{8\pi\epsilon_0 T} cot\frac{\theta}{2}$

$\frac{d\sigma}{d\Omega} = k^2 \frac{Z_1^2 Z_2^2 e^4}{4T^2} \frac{1}{sin^4\theta/2}$

$\Delta\lambda = \lambda' - \lambda = \frac{h}{mc}(1 - cos\theta)$

$n\lambda = 2dsin\theta$

$c = 3 \times 10^8 m/s$
$\hbar = h/2\pi = 1.05 \times 10^{-34} Js = 6.58 \times 10^{-16} eVs$
$hc = 1.99 \times 10^{-25} Jm = 1239.8 eVnm$
$\hbar c = 3.16 \times 10^{-26} Jm = 197.33 eVnm$
Bohr radius $a_0 = 0.53 \times 10^{-10} m$
$E_0 = 13.6 eV$
$R_\infty = 1.097 \times 10^7 m^{-1}$
$k = \frac{1}{4\pi\epsilon_0} = 8.99 \times 10^9 Nm^2 C^{-2}$