PHYS420 (Spring 2002)
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Equation Sheet for Exam #2
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Stefan's law	$e_{total} = \sigma T^4$	
Wien's displacement law	$\lambda_{\max}(m)T(K) = 2.898x10^{-3}\, m \cdot K$	
Planck's formula	$u(f,T) = \dfrac{8\pi h f^3}{c^3}\dfrac{1}{(e^{hf/k_bT} - 1)}$	
Balmer – Rydberg formula	$\dfrac{1}{\lambda} = R\left(\dfrac{1}{n_f^2} - \dfrac{1}{n_i^2}\right)$	
JJ Thomson's experiments	$\dfrac{e}{m_e} = \dfrac{V\theta}{B^2 ld}$	
Photoelectric effect	$KE_{\max} = hf - \phi$	$eV_{stopping} = KE_{\max}$
Half-life	$N(t) = N_0 e^{-\lambda t}$	$T_{1/2} = \dfrac{\ln 2}{\lambda}$
Bohr model	$\Delta E = hf$	$L = m_e v r = n\hbar$
	$r_n = \dfrac{n^2 a_0}{Z}$	$E_n = -\dfrac{ke^2}{2a_0}\left(\dfrac{Z^2}{n^2}\right) = -13.6\,eV\dfrac{Z^2}{n^2}$
Compton effect	$\lambda' = \lambda_0 + \dfrac{h}{m_e c}(1 - \cos\theta)$	
de Broglie wavelength	$\lambda_{deBroglie} = \dfrac{h}{mv}$	
Uncertainty Principle	$\delta x \cdot \delta p \geq \hbar$	$\delta E \cdot \delta t \geq \hbar$

Some useful constants

$h = 6.626x10^{-34}\, J \cdot s$	$hc = 1239.7\, eV \cdot nm$
$\sigma = 5.67x10^{-8}\, W \cdot m^{-2} \cdot K^{-4}$	$a_0 = 0.0529\, nm$
$k = 8.988x10^9\, N \cdot m^2 \cdot C^{-2}$	$R = 1.097x10^7\, m^{-1}$
$m_e = 9.109x10^{-31}\, kg$	$m_p = 1.673x10^{-27}\, kg$
$e = 1.602x10^{-19}\, C$	