

Phys212 Term-102

Formula Sheet

$$\Delta L = \frac{\Delta L'}{\gamma} \quad \Delta t = \gamma \Delta t' \quad x' = \gamma(x - vt) \quad t' = \gamma\left(t - \frac{v}{c^2}x\right)$$

$$u'_x = \frac{u_x - v}{1 - \left(\frac{u_x v}{c^2}\right)} \quad u'_{y,z} = \frac{u_{y,z}}{\gamma \left[1 - \left(\frac{u_x v}{c^2}\right)\right]} \quad f_{obs} = \frac{\sqrt{1 \pm (v/c)}}{\sqrt{1 \mp (v/c)}} f_{source}$$

$$E = \gamma m_0 c^2 = K + m_0 c^2 \quad p = \gamma m_0 u$$

$$\lambda' - \lambda = \frac{h}{m_e c} (1 - \cos \theta) \quad eV_s = hf - \phi \quad e = \sigma T^4 \quad E = nhf$$

$$\frac{e}{m} = \frac{V\theta}{B^2 l d} \quad q = \left(\frac{mg}{E}\right) \left(\frac{v+v'}{v}\right) \quad m_e v r = n\hbar \quad r_n = \frac{n^2 a_0}{Z}$$

$$E_n = \frac{-13.6 Z^2}{n^2} \quad \Delta n = \frac{k^2 Z^2 e^4 N n A}{4 R^2 K \sin^4\left(\frac{\phi}{2}\right)}$$

Constants :

$$e = 1.6 \times 10^{-19} \text{ C} \quad m_e = 9.1 \times 10^{-31} \text{ kg} \quad \hbar = 1.05 \times 10^{-34} \text{ J} \cdot \text{s}$$

$$m_p = 1.67 \times 10^{-27} \text{ kg} \quad c = 3 \times 10^8 \text{ m/s} \quad 1u = 1.66 \times 10^{-27} \text{ kg}$$

$$k_B = 1.38 \times 10^{-23} \text{ J/K} \quad k = 9 \times 10^9 \text{ N} \cdot \text{m}^2 \text{C}^{-2}$$

$$m_e c^2 = 0.511 \text{ MeV} \quad m_p c^2 = 938 \text{ MeV} \quad hc = 12400 \text{ eV} \cdot \text{Å}$$