Name: _____

Ch 24 : Electromagnetic Waves

$$v = f\lambda \qquad n = \frac{c}{v}$$

$$f_0 \approx f_s\left(1 + \frac{v_{rel}}{c}\right) \qquad v_{rel} << c$$

$$\overline{S} = \overline{S}_0 \cos^2\theta$$

Ch 25 : Reflection

$$\theta_r = \theta_i \qquad f = \frac{1}{2}R$$

$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f} \qquad m = \frac{h_i}{h_o} = \frac{-d_i}{d_o}$$

Ch 26 : Refraction

$$n = \frac{c}{v} \qquad n_1 \sin\theta_1 = n_2 \sin\theta_2$$

$$d' = d\frac{n_2}{n_1}$$

$$\sin\theta_c = \frac{n_2}{n_1} \qquad n_1 > n_2$$

$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f} \qquad m = \frac{h_i}{h_o} = \frac{-d_i}{d_o}$$

$$d_{o2} = s - d_{i1} \qquad m_{tot} = m_1 \times m_2 \times \ldots$$

$$P = \frac{1}{f}$$

Ch27 : Interference

$$\Delta l = m\lambda \qquad m = 0, \pm 1, \pm 2, \ldots$$

$$\Delta l = \left(m + \frac{1}{2}\right)\lambda \qquad m = 0, \pm 1, \pm 2, \ldots$$

$$t = \frac{m\lambda_{film}}{2} \qquad m = 0,1,2,3\ldots$$

$$\sin\theta = m\frac{\lambda}{d} \qquad \sin\theta = \left(m + \frac{1}{2}\right)\frac{\lambda}{d}$$

$$slits\ \ per\ cm = \frac{1}{d} \qquad \sin\theta = m\frac{\lambda}{d}$$

$$\sin\theta = m\frac{\lambda}{W} \qquad m = 1,2,3\ldots$$

$$\sin\theta = 1.22\frac{\lambda}{D} \qquad \theta_{\min} \approx 1.22\frac{\lambda}{D}$$

Ch 29 : Particles & Waves

$$E = hf$$

$$K_{\max} = hf - \phi$$

$$\lambda = \frac{h}{p} \qquad p = mv$$

$$\Delta x \Delta p_x \geq \frac{\hbar}{2}$$

Ch 30 : The Atom

$$E_n = -13.6eV\frac{Z^2}{n^2}$$

$$\Delta E = hf$$

$$\frac{1}{\lambda} = R\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$$

$$L = \sqrt{l(l+1)}\frac{h}{2\pi} \qquad l = 0,1,2,\ldots,n-1$$

$$L_z = m_l\frac{h}{2\pi} \qquad m_l = -l,-l+1,\ldots,-1,0,+1,\ldots,l-1,l$$

$$m_s = \pm\frac{1}{2}$$

$$1s, 2s, 2p, 3s, 3p, 4s, 3d, 4p, 5s, 4d, 5p, 6s, 4f, 5d, 6p, 7s$$

Ch 31 : Nuclear Physics & Radioactivity

$$A = N + Z \qquad {}^{A}_{Z}X$$

$$\Delta m = m(Z\ protons + N\ neutrons) - m(nucleus)$$

$$B.E. = \Delta mc^2$$

$${}^{A}_{Z}P \longrightarrow {}^{A-4}_{Z-2}D + {}^{4}_{2}He$$

$${}^{A}_{Z}P \longrightarrow {}^{A}_{Z+1}D + {}^{0}_{-1}e$$

$${}^{A}_{Z}P \longrightarrow {}^{A}_{Z-1}D + {}^{0}_{1}e$$

$${}^{A}_{Z}P^* \longrightarrow {}^{A}_{Z}D + \gamma$$

$$\frac{\Delta N}{\Delta t} = -\lambda N \qquad N = N_0 e^{-\lambda t} \qquad T_{1/2} = \frac{0.693}{\lambda}$$

Constants

$$c = 3.00 \times 10^8\ {}^{m}/_{s} \qquad m_p = 1.0072765u$$

$$1eV = 1.602 \times 10^{-19} J \qquad m_n = 1.0086649u$$

$$h = 6.626 \times 10^{-34} Js \qquad m_e = 0.0005486u$$

$$R = 1.097 \times 10^7 m^{-1} \qquad c^2 = 931.494\ MeV/u$$