From 203

$\vec{F} = m\vec{a}$ $\quad \mathbf{ma_{ucm} = \frac{mv^2}{R}}$ $\quad \vec{p} = m\vec{v}$ $\quad \vec{p}_i = \vec{p}_f$

$\mathbf{A_{sph\text{-}surf} = 4\pi\ r^2}$

$A_{circle} = \pi\ r^2$

$KE = \frac{1}{2}mv^2 = \frac{p^2}{2m}$ $\quad W_{tot} = \Delta(KE) = KE_f - KE_i$

$\mathbf{V_{sph} = \frac{4}{3}\pi\ r^3}$

$\mathbf{E = KE + U}$ $\quad \mathbf{E_i = E_f}$

$F = k\frac{q_1 q_2}{r^2} = \frac{1}{4\pi\varepsilon_o}\frac{q_1 q_2}{r^2}$ $\quad k = 8.99(10)^9\left[\frac{Nm^2}{C^2}\right]$ $\quad k = \frac{1}{4\pi\varepsilon_o}$

$\varepsilon_o = 8.85(10)^{-12}\left[\frac{C^2}{N\,m^2}\right]$

$E = \frac{F}{q}$ $\quad E = k\frac{q}{r^2} = \frac{1}{4\pi\varepsilon_o}\frac{q}{r^2}$

$\mathbf{\sum_{surf} E_\perp\ \Delta A = \frac{q_{inside}}{\varepsilon_o}}$

$V = \frac{U}{q}$

$V = k\frac{q}{r} = \frac{1}{4\pi\varepsilon_o}\frac{q}{r}$

$Q = VC$ $\quad V = Ed$ $\quad C = \frac{A\varepsilon_o}{d}$ $\quad \sigma = \frac{Q}{A}$ $\quad E = \frac{\sigma}{\varepsilon_o}$ $\quad \mathbf{\frac{QV}{2} = \frac{CV^2}{2} = \frac{Q^2}{2C}}$

$V = IR$ $\quad \sum_{junc} I_j = 0$ $\quad \sum_{loop} V_j = 0$ $\quad P = IV = I^2 R = \frac{V^2}{R}$

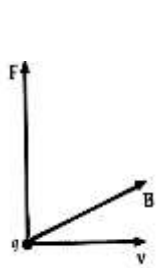
$R_{eff} = R_1 + R_2$ $\quad \frac{1}{C_{eff}} = \frac{1}{C_1} + \frac{1}{C_2}$

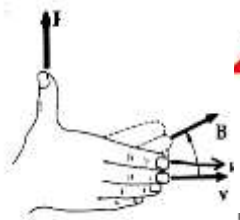
$\frac{1}{R_{eff}} = \frac{1}{R_1} + \frac{1}{R_2}$ $\quad C_{eff} = C_1 + C_2$

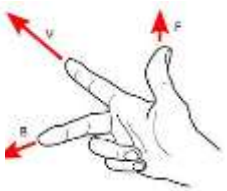
$\mathbf{\sim e^{-t/\tau}}$ $\quad \mathbf{\tau = RC}$ $\quad \mathbf{\tau = L/R}$

$F = qvB_\perp = qv_\perp B = qvB\sin(\theta)$

$F = ILB_\perp = I_\perp LB = ILB\sin(\theta)$







$\sum_{curv} B_{||}\,\Delta l = \mu_o I_\perp$

$B = \frac{\mu_o I}{2\pi r} = \frac{2k'I}{R}$ $\quad k' = \frac{\mu_0}{4\pi} = (10)^{-7}\ Tm/A$

$\mu_o = 4\pi(10)^{-7}\ Tm/A$

$$\Phi = \sum B_{\perp} \Delta A \qquad \mathcal{E} = -N \frac{\Delta \Phi}{\Delta t} \qquad \mathcal{E} = -L \frac{\Delta I}{\Delta t}$$

$$V = IZ \qquad Z_C = X_C = 1/\omega C \qquad Z_L = X_L = \omega L$$

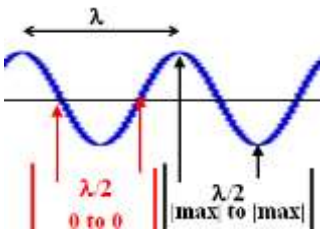
$$Z = \sqrt{R^2 + (X_L - X_C)^2} \qquad \omega_0 = 1/\sqrt{LC}$$

$$c = \lambda f \qquad f' = f(1 \pm v/c) \qquad \Delta f/f = \pm v/c$$

$$u = \frac{1}{2}\varepsilon_o E^2 + \frac{1}{2\mu_o} B^2 \qquad c = 3 \times 10^8 \, m/s = \frac{1}{\sqrt{\varepsilon_0 \mu_0}}$$

$$\frac{1}{f} = \frac{1}{o} + \frac{1}{i} \qquad m = -\frac{i}{o}$$

$$\theta_i = \theta_r \qquad n = c/v \qquad n_1 \sin(\theta_1) = n_2 \sin(\theta_2)$$



$$\Delta \ell \qquad d \sin(\theta) = \ldots \qquad \frac{d}{2} \sin(\theta) = \ldots$$

$$\frac{\lambda}{2} \text{ or } \lambda \quad \text{(add } \lambda\text{'s as needed)}$$

[total] = [reflection] + [path length]

$$E = mc^2 \qquad m = m_0 / \sqrt{1 - (v/c)^2} \qquad \tau = \tau_0 / \sqrt{1 - v^2/c^2} \qquad L = L_0 \sqrt{1 - v^2/c^2}$$

$$E = hf \qquad hf = \varphi_0 + \frac{1}{2} mv^2 \qquad h = 6.63(10)^{-34} \text{ Js} \qquad \text{ROYGBIV}$$

$$E = -13.6 \frac{(Z^*)^2}{n^2} (\text{eV}) \qquad r = .53 \frac{n^2}{Z} (\text{Å}) \qquad p = h/\lambda$$

$$L = n \frac{\lambda}{2}$$

$$E = \frac{p^2}{2m} + V(x) \qquad \psi(x) \qquad |\psi(x)|^2$$

$$\Delta p \, \Delta x \geq h/2\pi \qquad \Delta E \, \Delta t \geq h/2\pi$$

$$2l + 1$$

$$n = 1, 2, 3, \ldots \qquad l = 0, 1, 2, \ldots \qquad l = n-1, n-2, \ldots \qquad m = -l, -l+1, \ldots, l-1, l$$

$${}_1^1\mathbf{p} \qquad {}_0^1\mathbf{n} \qquad \mathbf{e}^- \qquad \mathbf{e}^+$$

938MeV .511MeV

$${}_Z^A X \qquad {}_2^4\mathbf{He}$$

$$N = N_0 \left(\frac{1}{2}\right)^{t/T_{1/2}}$$