

From 203

$$\vec{F} = m \vec{a}$$

$$m \vec{a}_{ucm} = \frac{m \vec{v}^2}{R}$$

$$\vec{p} = m \vec{v}$$

$$\vec{p}_i = \vec{p}_f$$

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

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

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

$$KE = \frac{1}{2} m v^2 = \frac{p^2}{2m}$$

$$W_{tot} = KE_f - KE_i$$

$$E = KE + U$$

$$E_i = E_f$$

$$F = k \frac{q_1 q_2}{r^2} = \frac{q_1 q_2}{4\pi \epsilon_0 r^2}$$

$$k = 8.99 (10)^9 \left[ \frac{Nm^2}{C^2} \right]$$

$$k = \frac{1}{4\pi \epsilon_0}$$

$$E = \frac{F}{q}$$

$$E = k \frac{q}{r^2} = \frac{q}{4\pi \epsilon_0 r^2}$$

$$\epsilon_0 = 8.85 (10)^{-12} \left[ \frac{C^2}{Nm^2} \right]$$

$$\Phi = \sum_{surf} E_{\perp} \Delta A = \frac{q_{inside}}{\epsilon_0}$$

$$V = U/q$$
  
$$V = k \frac{q}{r} = \frac{1}{4\pi \epsilon_0} \frac{q}{r}$$

$$Q = VC$$

$$V = Ed$$

$$C = \kappa \frac{A \epsilon_0}{d}$$

$$\sigma = Q/A$$

$$E = \frac{\sigma}{\epsilon_0}$$

$$V = IR$$

$$\sum_{junc} I_j = 0$$

$$\sum_{loop} V_j = 0$$

$$\frac{QV}{2} = \frac{CV^2}{2} = \frac{Q^2}{2C}$$

$$R_{eff} = R_1 + R_2$$

$$\frac{1}{C_{eff}} = \frac{1}{C_1} + \frac{1}{C_2}$$

$$P = IV = I^2 R = V^2 / R$$

$$\frac{1}{R_{eff}} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$C_{eff} = C_1 + C_2$$

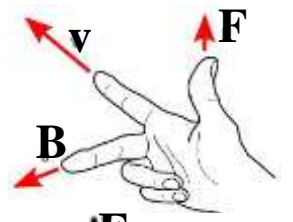
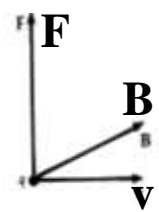
$$\sim e^{-t/\tau}$$

$$\tau = RC$$

$$\tau = L/R$$

$$F = q v B_{\perp} = q v_{\perp} B = q v B \sin(\theta)$$

$$F = IL B_{\perp} = I_{\perp} L B = IL B \sin(\theta)$$

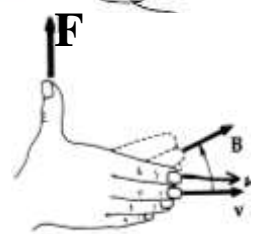
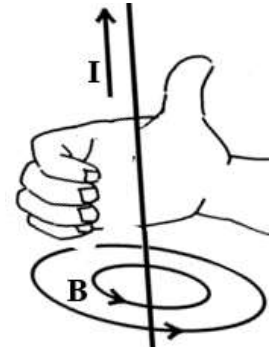


$$\sum_{curv} B_{\parallel} \Delta l = \mu_0 I_{\perp}$$

$$\mu_0 = 4\pi(10)^{-7} Tm/A$$

$$k' = \frac{\mu_0}{4\pi} = (10)^{-7} Tm/A$$

$$B = \frac{\mu_0 I}{2\pi R} = \frac{2k'I}{R}$$



$$\Phi = \sum B_{\perp} \Delta A \quad \mathcal{E} = -N \frac{\Delta \Phi}{\Delta t} \quad \mathcal{E} = -L \frac{\Delta I}{\Delta t} \quad \frac{I_1}{I_2} = \frac{V_2}{V_1} = \frac{N_2}{N_1}$$

$$\mathbf{V} = \mathbf{I} \mathbf{Z} \quad \mathbf{Z}_C = \mathbf{X}_C = 1/\omega \mathbf{C} \quad \mathbf{Z}_L = \mathbf{X}_L = \omega \mathbf{L}$$

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

$$c = \lambda f \quad f' = f \left(1 \pm \frac{v}{c}\right) \quad \frac{\Delta f}{f} = \pm \frac{v}{c}$$

$$c = 3 \times 10^8 \text{ m/s} = \frac{1}{\sqrt{\epsilon_0 \mu_0}}$$

$$u = \frac{1}{2} \epsilon_0 E^2 + \frac{1}{2} \mu_0 B^2$$

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

**||-f cent.-undev.**

$$n = \frac{c}{v} \quad n_1 \sin(\theta_1) = n_2 \sin(\theta_2)$$