FORMULARIO FISICA DOS

$k = \frac{1}{4\pi\epsilon_0} = 9 \times 10^9 N\frac{m^2}{C^2}$ $\qquad N_A = 6.022141 \times 10^{23} \acute{a}tomos/mol$
$\epsilon_0 = 8.8542 \times 10^{-12}\frac{C^2}{Nm^2}$ $\qquad e = 1.6022 \times 10^{-19} C$
$m_e = 9.1094 \times 10^{-31} Kg$ $\qquad m_p = 1.6726 \times 10^{-27} Kg$
$m_n = 1.67491 \times 10^{-27} Kg$ $\qquad eV = 1.6022 \times 10^{-19} J$

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

Campo Eléctrico y Fuerza Eléctrica

$\overrightarrow{F} = \frac{kq_1q_2}{r^2}\widehat{r} \qquad \overrightarrow{F}_T = \sum \overrightarrow{F}$
$\overrightarrow{E} = \frac{\overrightarrow{F}}{q_o} \qquad \overrightarrow{E} = \frac{kq}{r^2}\widehat{r} \qquad \overrightarrow{E} = \int \frac{kdq}{r^2}\widehat{r}$
$dq = \lambda dl \qquad dq = \sigma dA \qquad dq = \rho dV$

$E = \frac{\sigma}{\epsilon_0} \qquad E = \frac{\sigma}{2\epsilon_0}$

Dipolo eléctrico

$p = lq \qquad \tau = pEsen\theta \qquad \overrightarrow{\tau} = \overrightarrow{p} \times \overrightarrow{E} \qquad U = -\overrightarrow{p} \cdot \overrightarrow{E} = -pE\cos\theta$

Flujo eléctrico
$\Phi_E = \overrightarrow{E} \cdot \overrightarrow{A} = EA\cos\theta \qquad \Phi_E = \oint \overrightarrow{E} \cdot d\overrightarrow{A} \qquad \oint \overrightarrow{E} \cdot d\overrightarrow{A} = \frac{q_{encerrada}}{\epsilon_0}$

Energía Potencial Eléctrica
$U = \frac{kq_1q_2}{r} \qquad U_{sistema} = \sum U \qquad W = -\Delta U$

Potencial Eléctrico
$V = \frac{U}{q} \qquad V = \int \frac{kdq}{r} \qquad V = \frac{kq}{r} \qquad V_T = \sum V$
$\Delta V = -\int \overrightarrow{E} \cdot d\overrightarrow{l}$
$E_x = -\frac{dV}{dx} \qquad E_r = -\frac{dV}{dr} \qquad \overrightarrow{E} = -\nabla V$

CAPACITANCIA
$C = \frac{Q}{\Delta V}$ placas paralelas $C = \frac{\epsilon_0 A}{d}$
esférico $C = \frac{ab}{k(b-a)}$ cilíndrico $C = \frac{l}{2k\ln(\frac{b}{a})}$
Serie $\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2} + ... + \frac{1}{C_n}$
Paralelo $C_{eq} = C_1 + C_2 + ... + C_n$
$U = \frac{Q^2}{2C} = \frac{1}{2}C\Delta V^2$

dieléctricos $C = KC_o \qquad C = \frac{K\epsilon_0 A}{d} \qquad \Delta V = \frac{\Delta V_o}{K}$
$\int\int \overrightarrow{E} \cdot d\overrightarrow{A} = \frac{q_{encerrada}}{\epsilon} \qquad \epsilon = K\epsilon_0$

CORRIENTE, RESISTENCIA

$I = \frac{\Delta Q}{\Delta t}$ $\quad I = \frac{dq}{dt}$ $\quad I = nqA\overrightarrow{v}$

$J = \frac{I}{A}$ $\quad \overrightarrow{J} = nq\overrightarrow{v}_d$ $\quad V = IR$

$R = \frac{\rho L}{A}$ $\quad \rho = \frac{E}{J}$

$\rho(T) = \rho_o\left[1 + \alpha(T - T_o)\right]$

$P = VI$ $\quad P = Ri^2$ $\quad P = \frac{V^2}{R}$

resistencias en serie $R_{eq} = R_1 + R_2 + ... + R_n$

resistencias en paralelo $\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + ... + \frac{1}{R_n}$

CIRCUITOS DE CORRIENTE CONTINUA

Leyes de Kirchhoff $\sum_{nodo} I_{entran} = 0$ $\quad \sum_{malla} \Delta V = 0$

circuito simple RC carga $q(t) = CV(1 - e^{-\frac{t}{RC}})$

$i = \frac{V}{R}e^{-\frac{t}{RC}} = I_o e^{-\frac{t}{RC}}$ $\quad V_C = V(1 - e^{-\frac{t}{RC}})$

Descarga $\quad i = \frac{V_o}{R}e^{-\frac{t}{RC}}$ $\quad q(t) = Q_o e^{-\frac{t}{RC}}$

MAGNETISMO

$\overrightarrow{F} = q\overrightarrow{v} \times \overrightarrow{B}$

Fuerza de Lorentz $\quad \overrightarrow{F} = q\overrightarrow{E} + q\overrightarrow{v} \times \overrightarrow{B}$

$F = I\overrightarrow{l} \times \overrightarrow{B}$ $\quad \sum F = m\frac{v^2}{R}$

$\overrightarrow{\tau} = \overrightarrow{\mu} \times \overrightarrow{B}$ $\quad \overrightarrow{\mu} = NiA\widehat{n}$ $\quad \tau = \mu B sen\theta$

$U = -\overrightarrow{\mu} \cdot \overrightarrow{B} = -\mu B\cos\theta$

FUENTES DE CAMPO MAGNÉTICO

Ley de Biot-Savart $\overrightarrow{B} = \frac{\mu_o I}{4\pi}\int \frac{d\overrightarrow{l} \times \overrightarrow{r}}{r^2}$

Ley de Ampere $\oint \overrightarrow{B} \cdot d\overrightarrow{l} = \mu_o i_{enc}$

$\mu_o = 4\pi \times 10^{-7} Tm/A$ $\quad$ Conductor largo $B = \frac{\mu_o I}{2\pi r}$

Solenoide $B = \mu_o nI$ $\quad n = \frac{\#vueltas}{Longitud}$

Ley de Gauss $\oint \overrightarrow{B} \cdot \widehat{n}dA = 0$ $\quad \varepsilon = -N\frac{d\Phi_B}{dt}$ $\quad \Phi_B = \oint \overrightarrow{B} \cdot \widehat{n}dA$

$\varepsilon = \oint \overrightarrow{E} \cdot d\overrightarrow{l}$

INDUCTANCIA $\quad \varepsilon = -L\frac{di}{dt}$ $\quad L = \frac{N\Phi_B}{i}$ $\quad U = \frac{1}{2}LI^2$

$$\int \frac{du}{\sqrt{u^2 + a^2}} = \ln\left(u + \sqrt{u^2 + a^2}\right)$$

$$\int \frac{udu}{(u^2 + a^2)^{3/2}} = -\frac{1}{\sqrt{u^2 + a^2}}$$

$$\int \frac{du}{(u^2 + a^2)^{3/2}} = \frac{u}{a^2\left(\sqrt{u^2 + a^2}\right)}$$

$$\int \frac{du}{u} = \ln(u)$$