# Formulario de Fundamentos de Física

## Tema 1 – Campo eléctrico

$$\vec{E} = K\frac{q}{r^2}\hat{r} \qquad \vec{F} = q\vec{E} \qquad \overrightarrow{E_T} = \sum_i \overrightarrow{E_i} \qquad \overrightarrow{F_T} = \sum_i \overrightarrow{F_i}$$

$$E = K\frac{|q|}{r^2} \qquad F = |q|E \qquad \sum \vec{F} = m\vec{a} \qquad E = \frac{\sigma}{\varepsilon_r \varepsilon_0} = \frac{V}{d} \qquad K_{ef} = \frac{K}{\varepsilon_r}$$

## Tema 2 – Potencial eléctrico

$$E_{pe} = K\frac{q_1 q_2}{r}$$

$$V = K\frac{q}{r} \qquad V = \sum V_i \qquad \Delta V = V_b - V_a \qquad Q = CV$$

$$E_c = \frac{1}{2}mv^2$$

## Tema 3 – Campo magnético

$$\mu = \mu_0 \mu_r \qquad \vec{F}_m = q(\vec{v} \times \vec{B}) \qquad \vec{F}_m = I(\vec{l} \times \vec{B})$$

$$B = \frac{I\mu}{2\pi d} \qquad B = \frac{I\mu}{2r} \qquad B = \frac{N\mu I}{L} \qquad a_c = \frac{v^2}{r} \qquad v = \omega r \qquad v = \frac{2\pi r}{T} \qquad f = \frac{1}{T}$$

## Tema 4 – Inducción electromagnética

$$\phi = \vec{B} \cdot \vec{S} = BS\cos(\alpha) \qquad \varepsilon = -\frac{d\phi}{dt} \qquad \phi = LI \qquad L = \frac{N^2 \mu \pi r^2}{l} \qquad E = \frac{1}{2}LI^2$$

$$\vec{E} = E_0 \sin(\omega t - kx + \varphi)\hat{r_1}$$

$$f(x) = A\cos(ax) \rightarrow f'(x) = -Aa \cdot \sin(ax)$$

$$f(x) = A\sin(ax) \rightarrow f'(x) = \quad Aa \cdot \cos(ax)$$

## Tema 5 – Ondas electromagnéticas

$$\vec{B} = B_0 \sin(\omega t - kx + \varphi)\hat{r_2} \qquad c = \frac{E_0}{B_0} \qquad c = \frac{\omega}{k}$$

$$k = \frac{2\pi}{\lambda} \qquad \omega = 2\pi f \qquad \vec{S} = \frac{\vec{E} \times \vec{B}}{\mu} \qquad c = \lambda f$$

$$N = kg \cdot m/s^2$$

Unidades

## Tema 6 – Circuitos de corriente continua

$$T = \frac{Ns}{Cm}$$

$$R = \rho\frac{l}{A} \qquad R_{eq} = \sum R_i \qquad \frac{1}{R_{eq}} = \sum \frac{1}{R_i} \qquad V = IR \qquad I_C = \frac{V}{R}\left(1 - e^{\frac{t}{\tau}}\right)$$

$$\frac{1}{C_{eq}} = \sum \frac{1}{C_i} \qquad C_{eq} = \sum C_i \qquad \sum I = 0 \qquad \sum IR = \sum V$$

## Tema 7 – Circuitos de corriente alterna

$$\frac{1}{Z_{eq}} = \sum \frac{1}{Z_i} \qquad \frac{V_1}{V_2} = \frac{N_1}{N_2} \qquad I = \frac{I_{max}}{\sqrt{2}} \qquad V = \frac{V_{max}}{\sqrt{2}} \qquad V = V_{max}\sin(\omega t) \qquad |Z| = \sqrt{R^2 + (X_L - X_C)^2}$$

$$Z_{eq} = \sum Z_i \qquad Z_R = R \qquad Z_C = \frac{-1}{\omega C}i \qquad Z_L = \omega L i \qquad Z = |Z|e^{i\varphi} \qquad \varphi = acrtg\left(\frac{X_L - X_C}{R}\right) \qquad f_r = \frac{1}{2\pi\sqrt{LC}}$$

## Tema 8 – Física de los elementos ópticos de un sistema informático

$$\frac{1}{S_1} + \frac{1}{S_2} = \frac{1}{f}$$

$$E = W_e + E_c \qquad E = hf \qquad n = \frac{c}{v} \qquad n_i sen(\theta_i) = n_r sen(\theta_r)$$

$$hf = hf_0 + E_c \qquad \Delta n = n_e - n_o \qquad A_L = \frac{y'}{y} = \frac{s'}{s}$$

$$\mu_0 = 4\pi \cdot 10^{-7} TmA^{-1} \qquad m_e = 9{,}1 \cdot 10^{-31} kg$$

Constantes: $K = 9 \cdot 10^9 Nm^2/C^2$ $\quad c = 3 \cdot 10^8 m/s$ $\quad h = 6{,}63 \cdot 10^{-34} J \cdot s$

$1eV = 1{,}6 \cdot 10^{-19} J$ $\quad g = 9{,}8 m/s^2$ $\quad |q_e| = 1{,}6 \cdot 10^{-19} C$