

# CORRIENTE CONTINUA

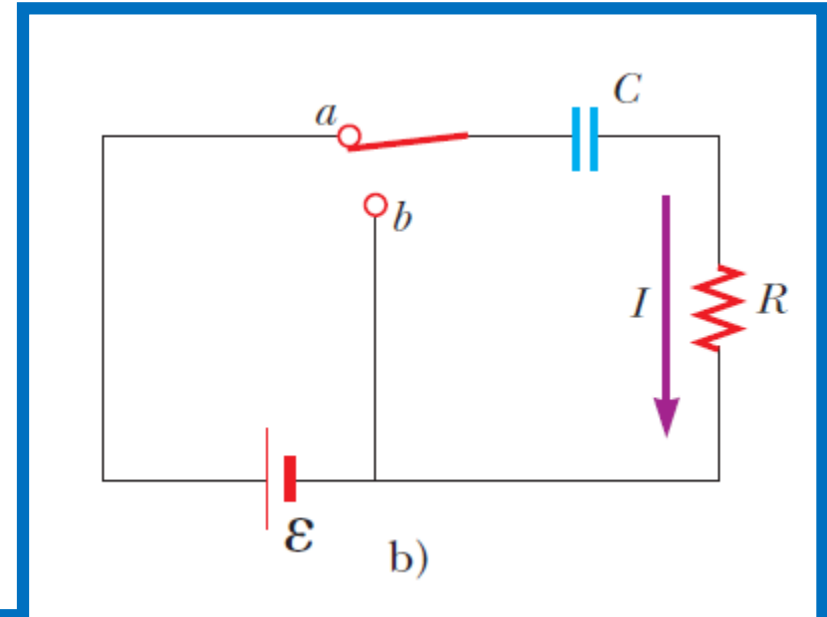
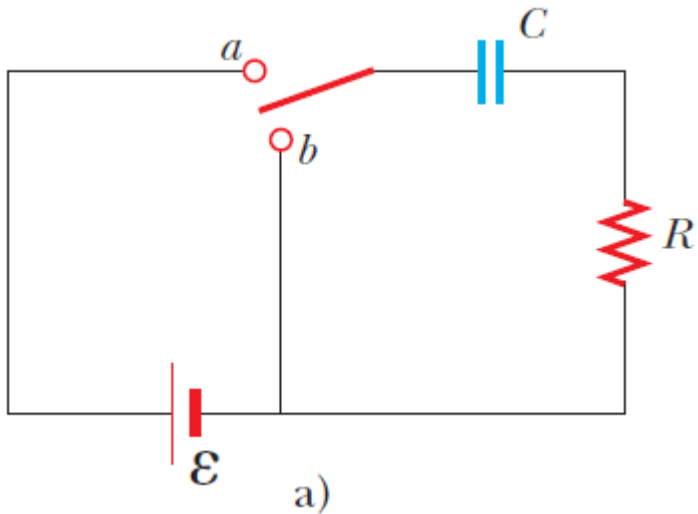
**Circuitos RC:**

**En carga**

**En descarga**

**Ejemplos**

# RC en carga



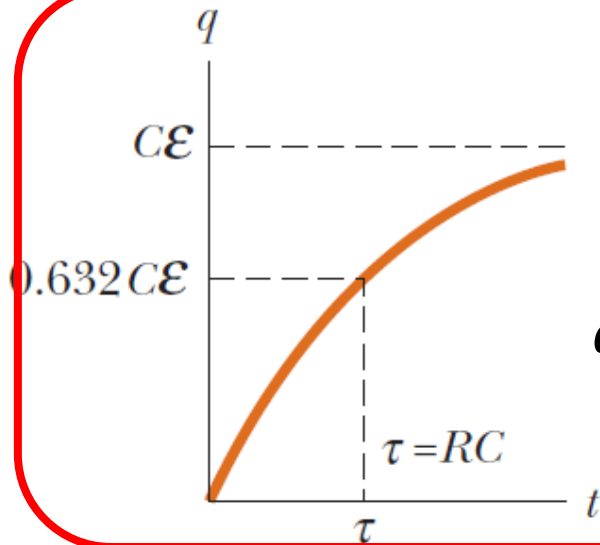
**Para  $t = 0$**

- $q(0) = 0$
- $I(0) = I_{max} = \frac{\varepsilon}{R}$
- $V_c(0) = \frac{q(0)}{C} = 0$
- $U_e(0) = 0$

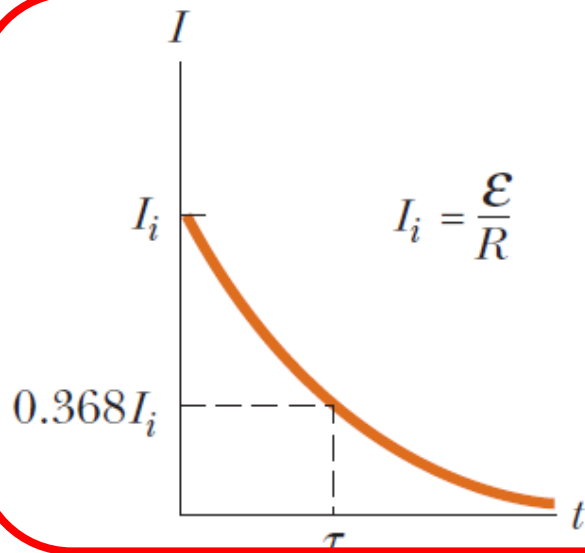
**Para  $t = \infty$**

- $q(\infty) = Q_{max} = C\varepsilon$
- $I(\infty) = 0$
- $V_c(\infty) = \frac{q(\infty)}{C} = \frac{Q_{max}}{C} = \varepsilon$
- $U_e(\infty) = \frac{1}{2} Q_{max} \varepsilon = \frac{1}{2} C \varepsilon^2 = \frac{1}{2} \frac{Q_{max}^2}{C}$

# RC en carga

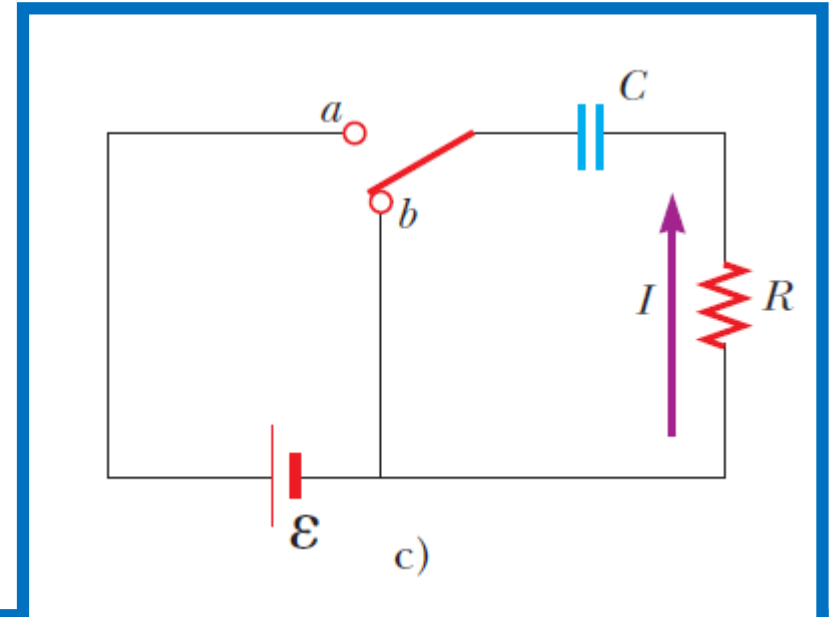
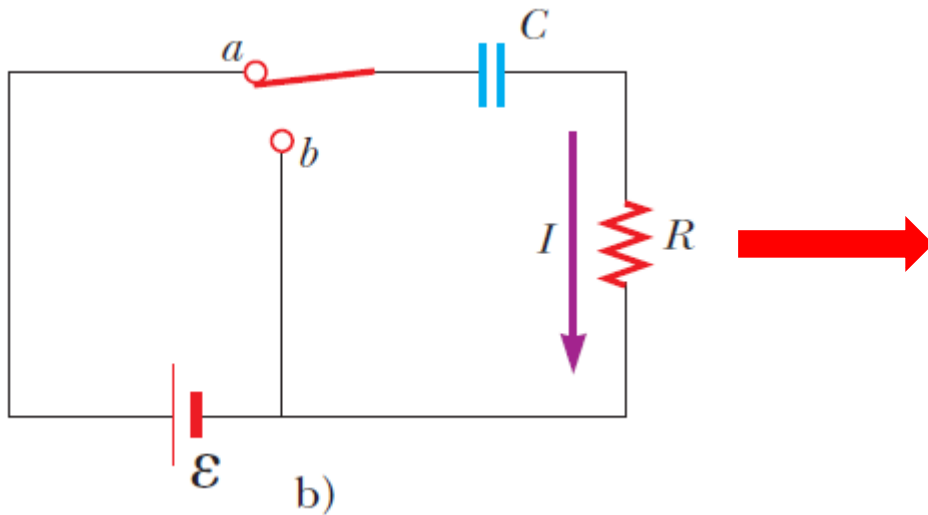


$$q(t) = C\varepsilon(1 - e^{-\frac{t}{RC}}) = Q_{max} \left(1 - e^{-\frac{t}{\tau_c}}\right)$$



$$I(t) = \frac{\varepsilon}{R} e^{-\frac{t}{RC}} = I_{max} e^{-\frac{t}{\tau_c}}$$

# RC en descarga



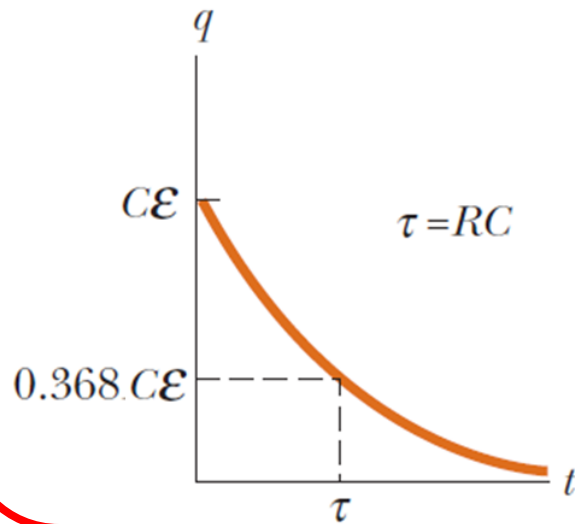
**Para  $t = 0$**

- $q(0) = Q_{max}$
- $I(0) = I_{max}$
- $V_c(0) = V_{c max} = \frac{Q_{max}}{C}$
- $U_e(0) = \frac{1}{2} Q_{max} V_{c max}$

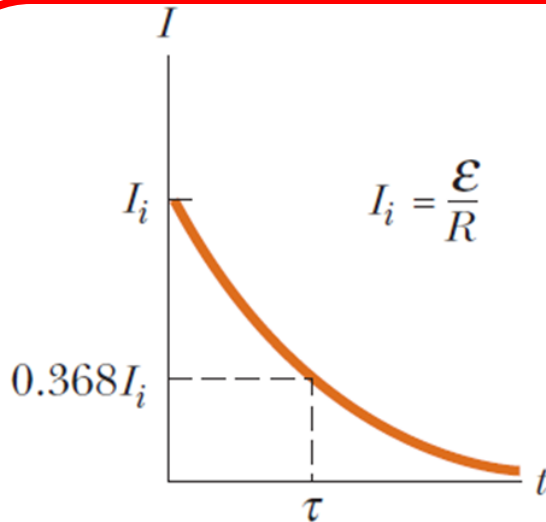
**Para  $t = \infty$**

- $q(\infty) = 0$
- $I(\infty) = 0$
- $V_c(\infty) = 0$
- $U_e(\infty) = 0$

# RC en descarga



$$q(t) = C\mathcal{E}e^{-\frac{t}{RC}} = Q_{max}e^{-\frac{t}{\tau_c}}$$



$$I(t) = \frac{Q_{max}}{RC}e^{-\frac{t}{RC}} = I_{max}e^{-\frac{t}{\tau_c}}$$

# Energía en el proceso de carga

*La energía entregada por la batería cuando el capacitor esta totalmente cargado es:*

$$Q_{\max}\mathcal{E} = C\mathcal{E}^2$$

*La energía almacenada en el capacitor es:*

$$U_{e-C} = \frac{1}{2} Q_{\max}\mathcal{E} = \frac{Q_{\max}^2}{2C} = \frac{1}{2} C\mathcal{E}^2$$

*La energía disipada en R:*

$$U_{e-R} = \frac{1}{2} Q_{\max}\mathcal{E} = \frac{Q_{\max}^2}{2C} = \frac{1}{2} C\mathcal{E}^2$$

# Circuito RC – Carga y Descarga

