

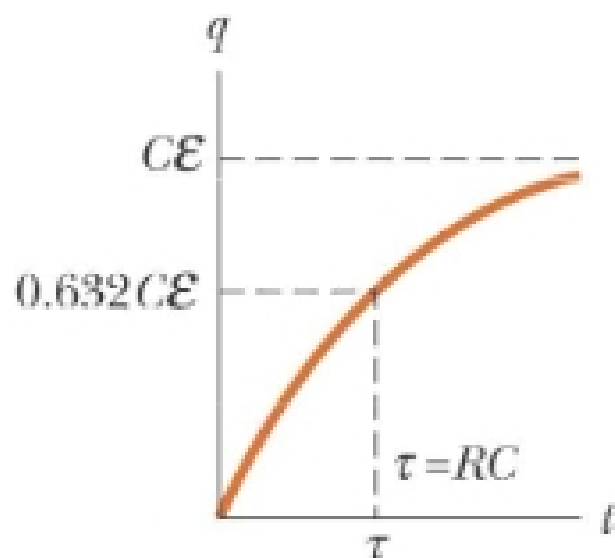
# Physics 202, Lecture 11

## Today's Topics

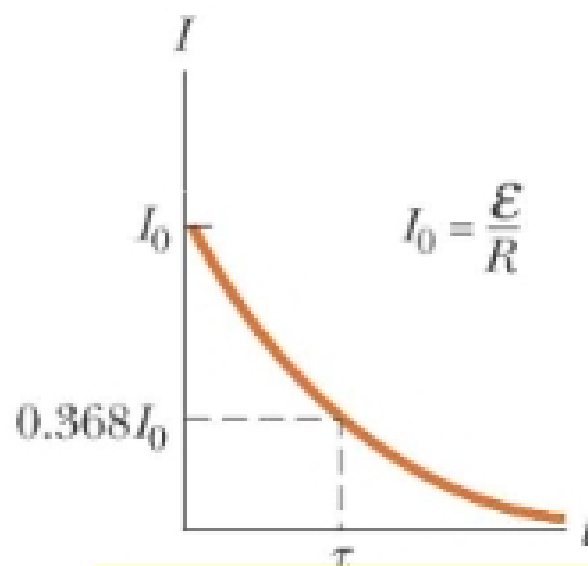
- RC circuit (ch. 28.4)
- Magnetic Field (ch. 29.1, 29.2)
  - Magnetic Field
  - Magnetic Forces
    - Between Bar Magnets
    - On A Charged Particle
    - On Current Carrying Wire
  - Earth Magnetic Field
    - South Pole or North Pole? (Confusing!)
- ❖ Expected from preview: north and south poles, Tesla, magnetic field lines, magnetic force.....

# Charging A Capacitor in RC Circuit

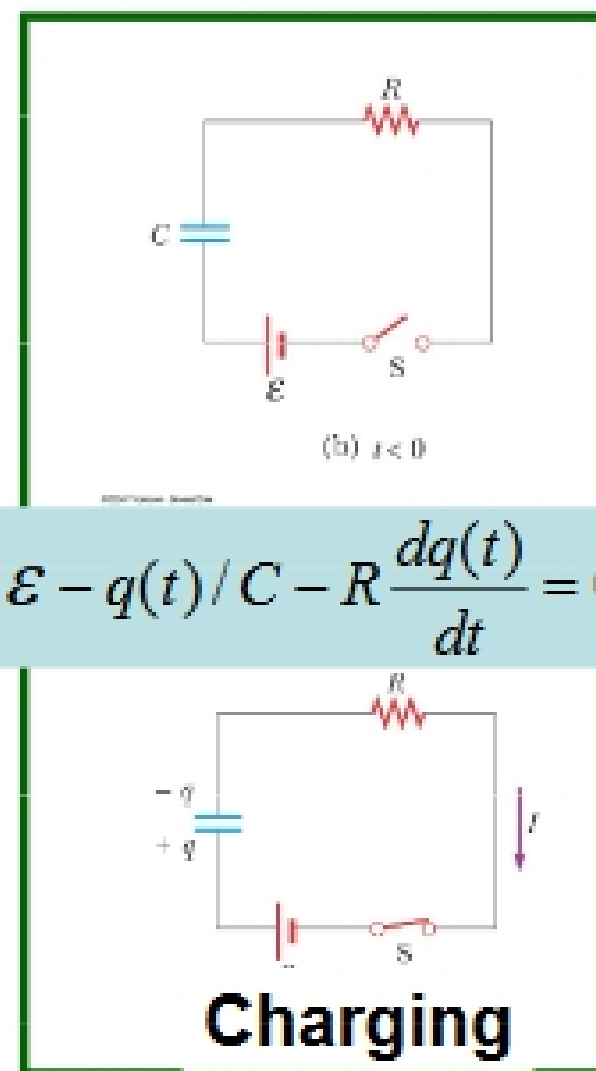
- Find  $I$  and  $q$  when a capacitor is being charged in a RC circuit (see board).



$$q(t) = \mathcal{E}C(1 - e^{-t/RC})$$



$$I(t) = \frac{\mathcal{E}}{R} e^{-t/RC}$$



$$\mathcal{E} - q(t)/C - R \frac{dq(t)}{dt} = 0$$

**Note:  $\tau \equiv RC$  is called time constant**

## Discharging A Capacitor in RC Circuit

- Find  $I$  and  $q$  when a capacitor is being discharged in a RC circuit (After class exercise).

$$q(t) = Qe^{-t/RC}$$

$$I(t) = -\frac{Q}{RC}e^{-t/RC}$$

Note the time constant  $\tau=RC$

