# Capacitors

- **Power, energy, charge**

$$p(t) = v(t) \cdot i(t)$$ brain cells

$$w(t) = \int p(t)\,dt$$

$$= \int v(t) \cdot \underbrace{i(t)\,dt}_{\downarrow}$$

$$= \int v(t)\, C \frac{dv}{dt}\, dt$$

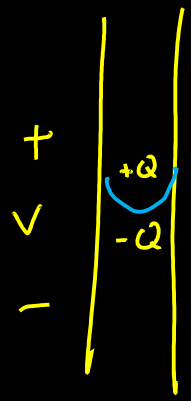
$$= C \int v(t)\,dv$$

$$= C \tfrac{1}{2} v^2$$

$$w(t) = \tfrac{1}{2} C V^2$$ brain cells

energy stored in a capacitor

$$Q = CV$$ brain cells




Q ~ gallons

# Capacitors

- **DC Steady State**