

Units

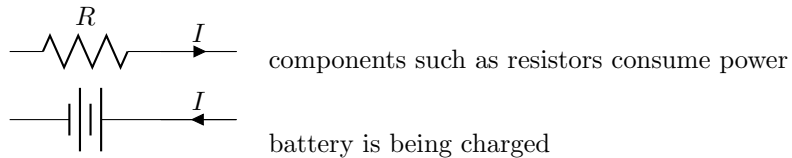
- Voltage (*volt* or V): $\frac{joules}{coulombs}$
- Current (*ampere* or A): $\frac{coulombs}{sec}$
- Power (*watt* or W): $\frac{joules}{sec}$
- Resistance (*Ohm* or Ω)

Concepts and Definitions

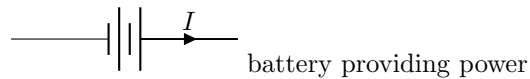
- One Coulomb: charge possessed by 6.24×10^{18} electrons
- Energy: capacity to do work
- Power: rate of change in energy and is computed as

$$P = VI$$

- Positive power implies power is being absorbed



- Negative power implies power is being supplied



- Resistance: restriction in flow of electrons which is based on the material

Laws

- Conservation of energy: energy cannot be created nor destroyed. Sum of all powers in any system equals zero: $\sum_i P_i = 0$
- Ohm's Law:

$$V = IR$$
- Kirchhoff's Voltage Law (KVL): $\sum_i V_i = 0$ in any loop
- Kirchhoff's Current Law (KCL): $\sum_i I_i = 0$ at any node