

## Units

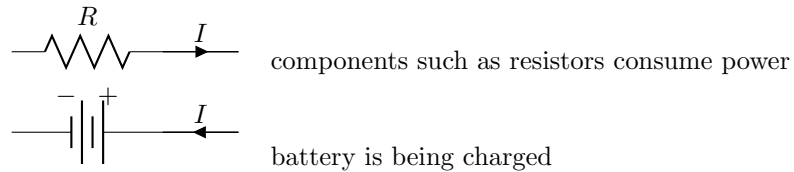
- Voltage (*volt* or V):  $\frac{joules}{coulombs}$
- Current (*ampere* or A):  $\frac{coulombs}{sec}$
- Power (*watt* or W):  $\frac{joules}{sec}$
- Resistance (*Ohm* or  $\Omega$ )

## Concepts and Definitions

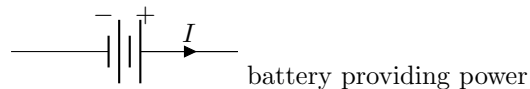
- One Coulomb: charge possessed by  $6.24 \times 10^{18}$  electrons
- Energy: capacity to do work
- Power: rate of change in energy and is computed as

$$P = VI$$

- 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