Electricity Review

Electrons

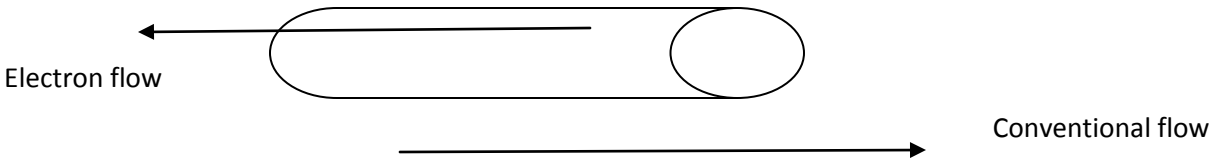
- electrons are what is actually moving through a conductor.
- one electron is a very small, so we 'bundle' them into 'coulombs'.
  1 coulomb © = 6.24×10^{18} electrons
- 1 electron has the charge of $1 / 6.24 \times \times 10^{18}$ coulombs
  … or… 1 electron has a charge of -1.6×10^{-19} C
  It's negative because an electron is negatively charged.

$e = -1.6 \times 10^{-19}$ C
1 coulomb = 6.24×10^{18} electrons

put these on formula sheet!

Circuits

- need a full, closed circuit (circle) in order for electricity to flow.
- know circuit symbols for: battery (+/- end as well), resistance, switch (open/closed) and lightbulb.
- early in the study of electricity, Benjamin Franklin proposed that positiveness flowed. This idea 'stuck' for quite a while. So although we KNOW electrons (-ve flow) move, we sometimes refer to +ve flow and we call this 'conventional current'.
- conventional current = +ve flow (= opposite direction to electron flow)



Simple formulas

Q = Ne where Q = charge in coulombs C)
N = number of electrons. +N = excess electrons
- N = deficit of electrons

$e = -1.6 \times 10^{-19}$ C

ie: What is the total charge on an object that has a deficit of 3 electrons?

Q = ? N = -3 $e = -1.6 \times 10^{-19}$ C

$Q = Ne = (-3)(-1.6 \times 10^{-19}\ C) = 4.8 \times 10^{-19}\ C$

The charge is 4.8×10^{-19} C

I = Q/t where I = current (C/s) * 1 C/s = 1 ampere or 1 amp (A)

t = time (s) Q = charge as above (C)

Current is the rate of electron flow. We don't count 'electrons' per say, but coulombs of electrons. Remember that electrons are very very small so we bundle them.

V = E/Q where V = potential difference (V)

E = energy (J) Q = charge as above (C)

Potential difference (more commonly known as 'voltage') measures the energy each coulomb of electrons possesses. The more energy a coulomb of electrons has, the more work they can do!

These formulas are pretty straight forward. To master your understanding, practice by doing the following problems:

<u>Homework</u>:

Copy: The 3 formulas onto your formula sheet

Problems:
11.5 - p. 518 # 1,2,3,4,5

11.3 – p. 513 # 1,2,3,4,6,7,8 (no #5)