**Flashback Exercise 1**

**Radiaoctivity**

1. Compared to combustion, a chemical exothermic process, what is the great advantage of fusion, which allows it to release so much more energy?

The energy released by exothermic chemical reactions comes from chemical bonds. But the energy released by fusion (or fission) comes from the conversion of a small amount of mass into a large amount of energy, according to $E = mc^2$. In chemical reactions, this is not possible, mass is conserved.

**Stoichiometry and Molarity**

2. a) If 250.0 ml of a 3.00 M $H_2SO_{4(aq)}$ solution are completely neutralized by potassium hydroxide, what volume of water will be produced? The density of liquid water is 1.00 g/ml at 25 $^oC$.

$2\ KOH_{(aq)} + H_2SO_{4(aq)} \rightarrow Na_2SO_{4(aq)} + 2H_2O_{(l)}$

$0.250\ L(3.00\ mol/L)\ H_2SO_{4(aq)} = 0.750\ moles\ H_2SO_{4(aq)}$

From the balanced equation:

$0.750\ moles\ H_2SO_{4(aq)} * (2\ mol\ H_2O_{(l)}) / 1\ mol\ H_2SO_{4(aq)} = 1.50\ moles\ H_2O_{(l)}$

$1.50\ moles\ H_2O_{(l)}\ (18.0\ g/mol) = 27.0\ g\ H_2O_{(l)}$

$27.0\ g\ H_2O_{(l)}\ (ml/1.00g) = 27.0\ ml\ H_2O_{(l)}$

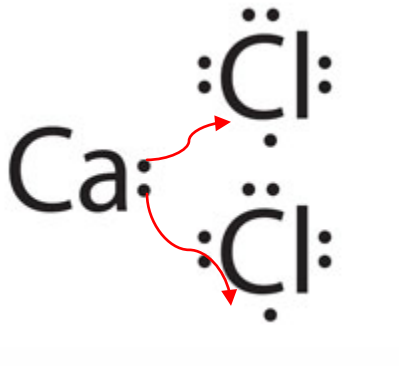
b) Report the answer with the correct number sig figs.

From the measurements used in the calculations(including 18.0 g/mole) the ones with the least sig figs have 3. So the answer has 3 SF, including the trailing zero, which is significant in the presence of a decimal.

**Bonding**

3. a) Use Lewis structures to reveal the reaction between calcium and chlorine.
   b) Then show the product and ...
   c) ....finally give the empirical formula of the compound created.

a)




b) $Cl^- \; Ca^{2+} \; Cl^-$

c) $CaCl_2$

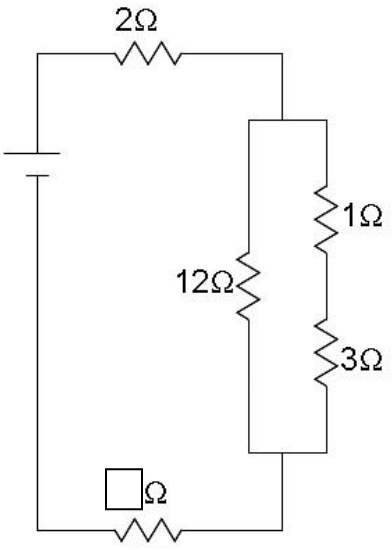
**Coulomb's Law**

4. If the distance between two opposite charges suddenly becomes only ¼ of the original , how will the force of attraction compare to the original one?

Flip ¼ and square it: $F_2/F_1 = 16$. If you had to go backwards, flip the force ratio and square root it to get the ratio of the radii.

**Circuits**

5. Find the missing resistance if 2.0 A flows through it and then eventually returns to a 12 V power source.




$R_T = V_T/I_T = 12/2 = 6\ \Omega.$

$R_p = [12^{-1} + (3+1)^{-1}]^{-1} = 3\ \Omega.$

$R_T = 6\ \Omega = R_p + 2 + x$

$6\ \Omega = 3 + 2 + x$

$x = 1\ \Omega.$