1.) The amount of charge flowing left-to-right through a certain wire is 36 C every 4 s. What is the average current?

2.) A certain 1.5 V flashlight battery is rated to "hold a charge of 2 amp-hours." That is colloquial language in combination with a non-SI unit. It means that the battery can cause a current of 2 A to flow for 1 hour or 1 A for 2 hours, or any product of current and time that gives 2 "amp-hours."

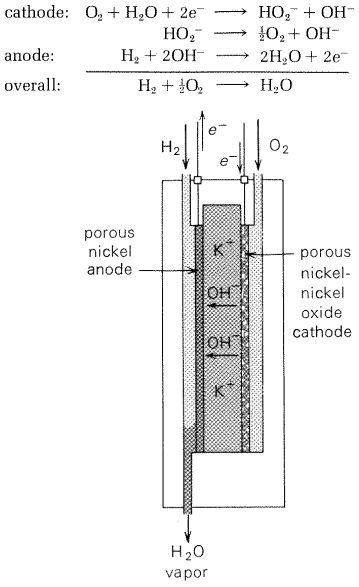
(a) Convert the "2 amp-hour" rating to an SI unit.

(b) How much energy does the battery hold?

3.) A car's headlight (just one bulb on low-beam) draws 5 A. If the bulb is on for five hours, how much charge flows through the bulb? Give your answer in an SI unit.

4.) A hydrogen fuel cell, like a battery, creates electricity from a chemical source. Unlike a battery, a fuel cell does not run down since the chemicals it relies on are supplied to it continuously. In a hydrogen-oxygen fuel cell a continuous supply of pure hydrogen (from a highly pressurized tank) and another continuous supply of oxygen (preferably from the atmosphere, but possibly from a pressurized tank) are used to produce water, heat, and most importantly, electric current. The chemical reactions in the fuel cell are shown below along with the sketch of the fuel cell. The important point is that every H_2 molecule produces a flow of two electrons. In order to power a car from hydrogen fuel cells, about 100 fuel cells will be used, and each of the 100 cells would need to deliver about 175 A of current. Note that one mole of H_2 (6.0228×10^{23} molecules or twice that number of atoms) has a mass of 2 g (g is the abbreviation for gram).

a.) Under these conditions, what is the mass flow rate of hydrogen (g/s of H_2 gas) needed by the car's fuel cells?



b.) How much H_2 needs to be stored in the car's "gas tank" to drive for 5 hours under the conditions described above? (Find the mass of the H_2 in the tank, in kg.)