Lesson 12 fuel cells

1) A hydrogen-oxygen fuel cell using an acidic electrolyte, operating at 25 $^{\circ}$C has gaseous oxygen and hydrogen pumped in at a pressure of 100 kpa. This cell is 70.0% efficient in transforming chemical energy into electrical energy. Oxygen is kept in a full cylinder.
   a) Write an overall equation for the redox reaction occurring in the fuel cell.

   b) What is the volume of the cylinder if one full cylinder of oxygen allows for the evolution of 30.00 MJ of electrical energy?

2) Using the templates shown on the right construct a hydrogen –oxygen fuel cell using an:
   - Proton exchange membrane electrolyte
   - Solid oxide electrolyte
   - Molten sodium carbonate electrolyte
   - Alkaline (KOH) solution.
   - Acidic H_3PO_4 electrolyte

   - Label the:
     Anode and cathode
     ions flow through the electrolyte and their direction
     Products and reactants
   Write the balanced half equations for each fuel cell. States not necessary.
   - Hint. When adding the two half equations they should always add up to $O_2 + H_2 \rightarrow 2H_2O$