5.3 EXERCISE 2 - electrochemical cells

1. Draw the conventional representation of the electrochemical cells to show how you would use the following reactions to make electricity (they are all spontaneous). In each case indicate the polarity of the electrodes.

a) $Fe(s) + Cu^{2+}(aq) \rightarrow Fe^{2+}(aq) + Cu(s)$
b) $2Fe^{3+}(aq) + 2I^{-}(aq) \rightarrow 2Fe^{2+}(aq) + I_2(aq)$
c) $Zn(s) + 2H^{+}(aq) \rightarrow Zn^{2+}(aq) + H_2(g)$
d) $2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$

2. Deduce the chemical reaction taking place in the following cells, given the following data:

Half-reaction	E/V
$Zn^{2+}(aq) + 2e \rightarrow Zn(s)$	-0.76
$Fe^{2+}(aq) + 2e \rightarrow Fe(s)$	-0.44
$Fe^{3+}(aq) + e \rightarrow Fe^{2+}(aq)$	+0.77
$Ag^{+}(aq) + e \rightarrow Ag(s)$	+0.80
$Cl_2(g) + 2e \rightarrow 2Cl^{-}(aq)$	+1.36

a)

$$Zn \,|\, Zn^{2+} \,||\, Fe^{3+}, Fe^{2+} \,|\, Pt$$

b)

$$Fe \,|\, Fe^{2+} \,||\, Fe^{3+}, Fe^{2+} \,|\, Pt$$

c)

$$Ag \,|\, Ag^{+} \,||\, Cl_2, Cl^{-} \,|\, Pt$$