Oxidation and Reduction Set 23: Electrochemistry

1. (b) $Zn \rightarrow Zn^{2+} + 2e^-$ $Sn^{2+} + 2e^- \rightarrow Sn$ (c) $Zn + Sn^{2+} \rightarrow Zn^{2+} + Sn$ (g) +0.62 V

2. (a) $Cr + 3Ag^+ \rightarrow Cr^{3+} + 3Ag$ +1.53 V (b) $Cu + Hg^{2+} \rightarrow Cu^{2+} + Hg$ +0.51 V
   (c) $Mg + Cu^{2+} \rightarrow Mg^{2+} + Cu$ +2.71 V (d) $Mg + 2Ag^+ \rightarrow Mg^{2+} + 2Ag$ +3.17 V
   (e) $Cr_2O_7^{2-} + 14H^+ + 6Fe^{2+} \rightarrow 2Cr^{3+} + 7H_2O + 6Fe^{3+}$ +0.46 V (f) $Cl_2 + 2I^- \rightarrow 2Cl^- + I_2$ +0.82 V

3. (a) Yes, +0.97 V (b) No, -0.53 V (c) No, -1.64 V (d) No, -0.34 V (e) Yes, +0.62 V

4. (a) Mg, Sr, Zn
   (b) Looking for a reducing agent or oxidising agent that falls between the two in the question
   (i) Sn or Ni
   (ii) acidified H_2O_2 or MnO_4^-
   (iii) Pb, Sn, Ni, Co
   (iv) $O_2/4H^+$
   (v) Au, $C\ell^-/H_2O$, $C\ell^-$

5. (a) Yes +0.36 V (b) No – 0.33 V (c) Yes +1.10 V (d) No -0.25 V (e) Yes +0.62 V

6. (a) $C\ell_2 + 2Br^- \rightarrow 2C\ell^- + Br_2$ $E_{cell} + 0.29V$

   (b) No reaction

   (c) $2A\ell + 6H^+ \rightarrow 2A\ell^{3+} + 3H_2$ $E_{cell} + 1.66\ V$

   (d) $Fe(s) + Sn^{2+} \rightarrow Fe^{2+} + Sn(s)$ $E_{cell} + 0.30V$

   (e) No Reaction $E_{cell} - 0.18V$ (f)

   (f) $3H_2S + 8H^+ + Cr_2O_7^{2-} \rightarrow 2Cr^{3+} + 3S + 7H_2O$ $E_{cell} + 1.09V$

   (g) No Reaction

   (h) $C\ell_2 + Fe^{2+} \rightarrow 2C\ell^- + Fe^{3+}$ $E_{cell} + 0.59V$