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ANSWERS

1. (a) $Co(s) \rightarrow Co^{2+}(aq) + 2\ e^-$ (oxidation half-reaction)
   $Sn^{2+}(aq) + 2\ e^- \rightarrow Sn(s)$ (reduction half-reaction)
   (b) $Pb(s) \rightarrow Pb^{2+}(aq) + 2\ e^-$ (oxidation half-reaction)
   $Ag^+(aq) + e^- \rightarrow Ag(s)$ (reduction half-reaction)
   (c) $Fe^{2+}(aq) \rightarrow Fe^{3+}(aq) + e^-$ (oxidation half-reaction)
   $I_2(s) + 2\ e^- \rightarrow 2\ I^-(aq)$ (reduction half-reaction)

2. (a) Cobalt is oxidized.
   Tin(II) ions are reduced.
   (b) Lead is oxidized.
   Silver ions are reduced.
   (c) Iron(II) ions are oxidized.
   Iodine is reduced.

3. (a) $Ni(s) \rightarrow Ni^{2+}(aq) + 2\ e^-$ (oxidation half-reaction)
   $Cu^{2+}(aq) + 2\ e^- \rightarrow Cu(s)$ (reduction half-reaction)
   Chloride ions are spectator ions.
   (b) $Cr^{2+}(aq) \rightarrow Cr^{3+}(aq) + e^-$ (oxidation half-reaction)
   $Sn^{2+}(aq) + 2\ e^- \rightarrow Sn(s)$ (reduction half-reaction)
   Nitrate ions are spectator ions.

4. (a) $Cl_2(g) + 2\ KI(aq) \rightarrow I_2(s) + 2\ KCl(aq)$
   (b) $Cl_2(g) + 2\ I^-(aq) \rightarrow I_2(s) + 2\ Cl^-(aq)$
   (c) $2\ I^-(aq) \rightarrow I_2(s) + 2\ e^-$ (oxidation half-reaction)
   $Cl_2(s) + 2\ e^- \rightarrow 2\ Cl^-(aq)$ (reduction half-reaction)
   (d) Iodide ions are oxidized.
   Chlorine is reduced.