

Chemguide – answers

THE ELECTROCHEMICAL SERIES

- a) Oxidation is loss of electrons; reduction is gain of electrons. (OIL RIG)

b) An oxidising agent oxidises something else. That means that it must take electrons from the other substance.

c) A reducing agent reduces something else. That means that it must give electrons to the other substance.
- a) A reducing agent gives electrons to something else. The species in the list which gives away electrons most readily is Li. That is the equilibrium which lies most strongly to the left, having the most negative E^0 .

b) An oxidising agent takes electrons from something else. The species in the list which accepts electrons most readily is the Au^{3+} ion, because that is the equilibrium which lies furthest to the right.

c) Reduction is gain of electrons. The species which gains electrons most easily is the Au^{3+} ion.

d) Oxidation is loss of electrons. The species which loses electrons most easily is Li.

e) Oxidising agents remove electrons from something else, and so the answer must be one of the ions, because the metals don't have any way to accept electrons. Of the two, the zinc E^0 value is the more positive (less negative), implying that the equilibrium lies further to the right than the magnesium equilibrium, and so accepts electrons more readily. The answer is Zn^{2+} .

f) Reducing agents give electrons to something else, and so the answer must be one of the metals. Of the two, the copper E^0 value is the more negative (less positive), implying that it has a greater tendency to give away electrons than silver does. The answer is therefore Cu.

g) Oxidation is loss of electrons, and so the answer must be either Ca or Al. Of these, the calcium E^0 value is more negative, showing that it loses electrons more easily. The answer is Ca.

h) Reduction is gain of electrons, and so the answer must be one of the ions. Of the two, lead has the more positive (less negative) E^0 and so lead ions are more likely to accept electrons than iron ions. The Pb^{2+} ions are more easily reduced.

Warning! It is *very* easy to get confused about this. If you got any wrong, make sure that you understand why, and then try the questions again in a day or two's time.