Redox Homework #1 Assigning Oxidation Numbers

-/	1)	Assign t	he oxidation	state for nitroger	n in each of	the following.
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a) N₂

b) N₂O

c) NO

d) NH₃

e) NO₃

f) Li₃N

g) N₂H₄

h) NO₂

i) NO₂⁻

2) Assign the oxidation state for chlorine in each of the following:

a) ClO-

b) ClO₃

c) Cl₂

d) ClO₂⁻

e) ClO₄

f) HCl

3) Assign oxidation states for all atoms in each of the following compounds:

a) KMnO₄

b) NiO₂

c) P_4O_6

d) FeO

e) Fe_2O_3

f) SF₄

g) CO

h) $Na_2C_2O_4$

i) UO₂²⁺

j) As₂O₃

k) NaBiO₃

1) H₂O₂

m) Fe₃O₄

n) BeH₂

o) NaH

4) Identify each of the following changes as either an oxidation or a reduction.

a)
$$5e^- + 8H^+ + MnO_4^- \Longrightarrow Mn^{2+} + 4 H_2O$$

b)
$$C_2O_4^{2-} \leftrightarrows 2CO_2 + 2e^-$$

c)
$$H_2O_2 \stackrel{\leftarrow}{\Longrightarrow} O_2 + 2H^+ + 2e^-$$

d)
$$2F^- \hookrightarrow F_2 + 2e^-$$

e) $Cu^{2+} + 2e^- \hookrightarrow Cu$

f)
$$2H_2O \Leftrightarrow O_2 + 4H^+ + 4e^-$$

g)
$$2H_2O + 2e^- \Leftrightarrow H_2 + 2OH^-$$

h)
$$2H^+ + 2e^- \rightleftharpoons H_2$$

i)
$$I_2 + 2e^- \Leftrightarrow 2I^-$$

$$j) Br_2 + 2e^- \Leftrightarrow 2Br^-$$

5) Specify which of the following are oxidation—reduction reactions, and identify the oxidizing agent, the reducing agent, the substance being oxidized, and the substance being reduced.

$$a) \ Cu(s) + 2Ag^{\scriptscriptstyle +}(aq) \leftrightarrows 2Ag(s) + Cu^{2\scriptscriptstyle +}(aq)$$

b)
$$Zn(s) + 2H^{+}(aq) \Longrightarrow Zn^{2+}(aq) + H_{2}(g)$$

c)
$$Cr_2O_7^{-2}(aq) + 2OH^-(aq) \Longrightarrow 2CrO_4^{-2}(aq) + H_2O(1)$$

d)
$$O_3(g) + NO(g) \stackrel{\leftarrow}{\Longrightarrow} O_2(g) + NO_2(g)$$

e)
$$2H_2O_2(1) \rightleftharpoons 2H_2O(1) + O_2(g)$$

f)
$$2CuCl(aq) \Leftrightarrow CuCl_2(aq) + Cu(s)$$

g)
$$CH_4(g) + 2O_2(g) \rightleftharpoons CO_2(g) + 2H_2O(g)$$

h)
$$HCl(g) + NH_3(g) \Longrightarrow NH_4Cl(s)$$

i)
$$SiCl_4(1) + 2H_2O(1) \Longrightarrow 4HCl(aq) + SiO_2(s)$$

$$j) \ SiCl_4(l) + 2Mg(s) \leftrightarrows 2MgCl_2(s) + Si(s)$$