Unit 8, Lesson 02: Answers to Practice with Oxidation Numbers

1. Find the oxidation numbers of the elements in **bold** print.

a) H**Cl**O Cl is 1+

b) K**Cl**O_3 Cl is 5+

c) **Mn**O_2 Mn is 4+

d) **Pb**SO_4 Pb is 2+

e) Na**I**O_4 I is 7+

f) **Cl**O_4^{1-} Cl is 7+

g) Na_2**O_2** O is 1–

h) K_2**S**O_4 S is 6+

i) **N**H_4^{1+} N is 3 –

2. State whether the change is an oxidation or a reduction.

a) MnO_4^{1-} becomes MnO_4^{2-} **reduction**

b) N_2 becomes NH_3 **reduction**

c) O^{2-} becomes O_2 **oxidation**

d) P_4O_6 becomes P_4O_{10} **oxidation**

e) NH_3 becomes N_2O **oxidation**

f) SO_4^{2-} becomes $S_2O_3^{2-}$ **reduction**

3. Identify the oxidizing and reducing agents in the following unbalanced reactions:

a) $I_2 + H_2S \rightarrow HI + S$

I oxidation number goes from 0 to 1–. It is reduced it is the oxidizing agent.

S oxidation number goes from 2– to 0. It is oxidized it is a reducing agent.

b) $Zn + HNO_3 \rightarrow Zn(NO_3)_2 + NO_2 + H_2O$

Zn oxidation number goes from 0 to 2+. It is oxidized it is the reducing agent.

N oxidation number goes from 5+ to 4+. It is reduced it is an oxidizing agent.

c) $Ag_2O + NH_3 \rightarrow Ag + H_2O + N_2$

Ag oxidation number goes from 1+ to 0. It is reduced it is the oxidizing agent.

N oxidation number goes from 3– to 0. It is oxidized it is a reducing agent.

Cl oxidation number goes from 5+ to 1–. It is reduced it is the oxidizing agent.

d) $H_2O + ClO_3^{1-} + SO_2 \rightarrow SO_4^{2-} + HCl$

S oxidation number goes from 4+ to 6+. It is oxidized it is a reducing agent.

Cr oxidation number goes from 6+ to 3+. It is reduced it is the oxidizing agent.

e) $K_2Cr_2O_7 + HBr \rightarrow KBr + CrBr_3 + H_2O + Br_2$

Br oxidation number goes from 1– to 0. It is oxidized it is a reducing agent.

Sn oxidation number goes from 2+ to 4+. It is oxidized it is the reducing agent.

f) $SnCl_2 + PbCl_4 \rightarrow SnCl_4 + PbCl_2$

Pb oxidation number goes from 4+ to 2+. It is reduced it is an oxidizing agent.

Sb oxidation number goes from 0 to 3+. It is oxidized it is the reducing agent.

g) $Sb + Cl_2 \rightarrow SbCl_3$

Cl oxidation number goes from 0 to 1–. It is reduced it is an oxidizing agent.

I oxidation number goes from 1– to 0. It is oxidized it is the reducing agent.

h) $NaI + H_2SO_4 \rightarrow H_2S + I_2 + Na_2SO_4 + H_2O$

S oxidation number goes from 6+ to 2–. It is reduced it is an oxidizing agent.