

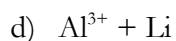
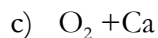
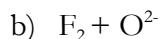
Worksheet #1

Writing half reactions

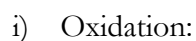
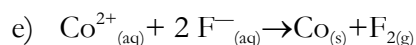
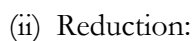
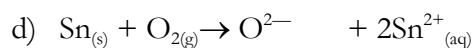
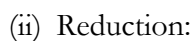
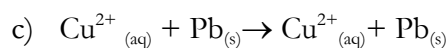
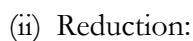
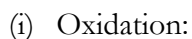
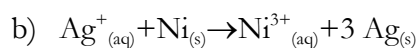
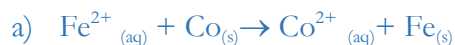
1. Define each: Remember “Oil Rig”: Oxidation is loss (of e^-) reduction is gain (of e^-)
 - a) Oxidation
 - b) Reduction
 - c) Oxidizing agent
 - d) Reducing agent

2. Write half reactions for each of the following atoms or ions. Label each as oxidation or reduction. Use the Activity Series Chart.
 - a) Al
 - b) Ba^{2+}
 - c) Br_2
 - d) Ca
 - e) Ga^{3+}
 - f) H_2
 - g) H^+

3. Balance the spontaneous redox reaction below. A spontaneous reaction is a reaction that occurs: 1) by a driving force that favors the product, 2) the free energy of the product is lower than the free energy of the reactant, and/or 3) occurs without any outside 'help' such as electrolysis. Identify the entities reduced and oxidized. State the reducing agent and the oxidizing agent.



4. Write the oxidation and reduction reactions for each redox reaction. The first one is done for you.



Redox Half Reactions and Reactions WS #1

Define each

- (g) Oxidation - **loss of electrons**
- (g) Reduction - **gain of electrons**
- (g) Oxidizing agent - **causes oxidation by undergoing reduction**
- (g) Reducing agent - **causes reduction by undergoing oxidation**

Write half reactions for each of the following atoms or ions. Label each as oxidation or reduction.

1. $\text{Al} \rightarrow \text{Al}^3+ + 3\text{e}^-$ **oxidation**
2. $\text{Ba}^{2+} + 2\text{e}^- \rightarrow \text{Ba}$ **reduction**
3. $\text{Ca} \rightarrow \text{Ca}^{2+} + 2\text{e}^-$ **oxidation**
4. $\text{Ga}^{3+} + 3\text{e}^- \rightarrow \text{Ga}$ **reduction**
5. $\text{H}_2 \rightarrow 2\text{H}^+ + 2\text{e}^-$ **oxidation**
6. $2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2$ **reduction**

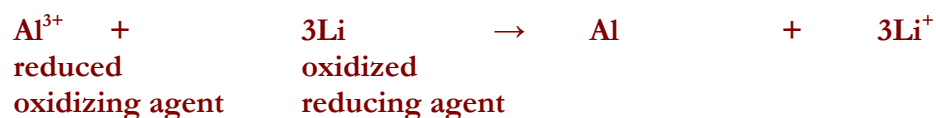
Balance each spontaneous redox equation. Identify the entities reduced and oxidized. State the reducing agent and the oxidizing agent.

1. Al & Zn²⁺
 - i. $2\text{Al} + 3\text{Zn}^{2+} \rightarrow 2\text{Al}^{3+} + 3\text{Zn}$
 - ii. **oxidized** **reduced**
 - iii. **reducing agent** **oxidizing agent**

2. F₂ & O²⁻
 - i. $2\text{F}_2 + 2\text{O}^{2-} \rightarrow 4\text{F}^- + \text{O}_2$
 - ii. **reduced** **oxidized**
 - iii. **oxidizing agent** **reducing agent**

3. O₂ & Ca
 - i. $2\text{Ca} + \text{O}_2 \rightarrow 2\text{Ca}^{2+} + 2\text{O}^{2-}$
 - ii. **oxidized** **reduced**
 - iii. **reducing agent** **oxidizing agent**

4. Al³⁺ & Li



Label the species that is **reduced**, that is **oxidized**, the **reducing agent** and the **oxidizing agent**.

