CHEM 121: Redox Practice Problems

1. Determine the oxidation for each of the following:
   a. O₂: O: 0
   b. Al₂S₃: Al: +3 S: -2
   c. P₄: P: 0
   d. Cd₃N₂: Cd: +2 N: -3
   e. MgCl₂: Mg: +2 Cl: -1
   f. Na: Na: 0
   g. NH₃: N: -3 H: +1
   h. PbO₂: Pb: +4 O: -2
   i. HBr: H: +1 Br: -1
   j. K: K: 0
   k. H₂S: H: +1 S: -2
   l. I₂: I: 0

2. For each of the following,
   a. Balance the equation,
   b. Identify the element or ion in a compound that is oxidized,
   c. Identify the element or ion in a compound that is reduced,
   d. Identify the oxidizing agent and the reducing agent.
   
<table>
<thead>
<tr>
<th>Oxidation Level</th>
<th>Reduction Level</th>
<th>Overall Reaction</th>
<th>Oxidizing Agent</th>
<th>Reducing Agent</th>
</tr>
</thead>
</table>
   A. 2 HCl (aq) + Zn (s) → H₂ (g) + ZnCl₂ (aq)
       H⁺ in HCl is the reactant reduced, and HCl is the oxidizing agent.
       Zn is the reactant oxidized and the reducing agent.
   B. 3 CuCl₂ (aq) + 2 Al (s) → 3 Cu (s) + 2 AlCl₃ (aq)
       Cu²⁺ in CuCl₂ is the reactant reduced, and CuCl₂ is the oxidizing agent.
       Al is the reactant oxidized and the reducing agent.
   C. 2 Na (s) + Cl₂ (g) → 2 NaCl (s)
       Cl₂ is the reactant reduced and the oxidizing agent.
       Na is the reactant oxidized and the reducing agent.
   D. 2 HBr (aq) + Mg (s) → H₂ (g) + MgBr₂ (aq)
       H⁺ in HBr is the reactant reduced, and HBr is the oxidizing agent.
       Mg is the reactant oxidized and the reducing agent.
   E. 4 Fe (s) + 3 O₂ (g) → 2 Fe₂O₃ (s)
       O₂ is the reactant reduced and the oxidizing agent.
       Fe is the reactant oxidized and the reducing agent.
   F. 2 AlCl₃ (aq) + 3 Mg (s) → 2 Al (s) + 3 MgCl₂ (aq)
       AlCl₃ is the reactant reduced and the oxidizing agent.
       Mg is the reactant oxidized and the reducing agent.