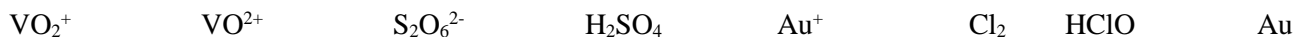


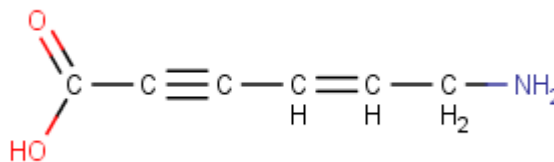
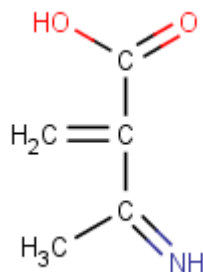
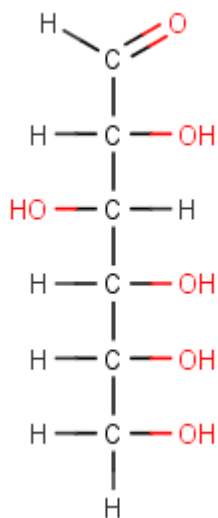
1. Which of the following molecules can be reduced by KI?



2. Assign oxidation states to each atom in the following molecules:

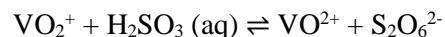


3. Determine the oxidation state or EACH carbon (you need the Lewis structure approach for this).

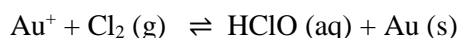


4. Combustion reactions are redox reactions. Determine the total number of electrons that are passed from carbon to oxygen when each of the molecules in problem 2 is combusted. Note that NH_3 is a product in the combustion of the second and third molecules.

5. Balance this redox reaction and determine E° .



6. Consider the following reaction:



- Balance the reaction
- Identify the Oxidizing Agent
- Identify the Reducing Agent
- Determine E° and ΔG°
- Determine K at standard conditions.
- If $[\text{Au}^+] = 10 \mu\text{M}$, $[\text{Cl}_2] = 5 \mu\text{M}$, and $[\text{HClO}] = 10 \text{mM}$, determine if the reaction is spontaneous at neutral pH and 50°C .
- If $[\text{Au}^+] = 10 \mu\text{M}$, $[\text{Cl}_2] = 5 \mu\text{M}$, and $[\text{HClO}] = 10 \text{mM}$, determine the pH that will make this reaction non-spontaneous at 50°C .

Recall that

$$\Delta G^\circ = -nFE^\circ$$

$$\Delta G = \Delta G^\circ + RT \ln Q$$

$$R = 8.314 \text{ J/mol K}$$

$$F = 96485 \text{ J/mol V}$$