1. Are the following reactions oxidations, reductions, or neither?

   - 2° alcohol → ketone  oxidation
   - aldehyde → 1° alcohol  reduction
   - alkene → ketone  oxidation
   - 1,2 diols → alkene  reduction
   - carboxylic acid → aldehyde  reduction

2. Are the following reagents oxidants, reductants, or neither?

   - lithium aluminum hydride  reductant
   - chromic acid  oxidant
   - potassium permanganate  oxidant
   - hydrogen gas over platinum  reductant
   - ozone  oxidant
   - peroxyacid  oxidant
   - osmium tetroxide  oxidant

   Grignard reagent (assume it is being added to a carbonyl)

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   \text{think } \text{C}_2\text{H}_4\text{Br} \rightarrow \text{C}_2\text{H}_4\text{CH}_2\text{Br}^+ \]

3. Assume that you wanted to turn an alkene into a 1,2 diol. Describe three ways that you could do that, and discuss the differences between the 1,2 diol products formed, if any.

   - The peroxyacid method adds OH to opposite side of the double bond, and the other two methods add OH to the same side of the bond. The permanganate and Os tetroxide products are the same.