This homework assignment is due on Thursday, September 30, at class time.

1. (20 points) For each of the following:
   a. Draw the Lewis structure.
   b. Indicate the molecular shape (linear, triangular, pyramidal, tetrahedral, or bent). Reference Table 4.6
   c. State whether the species is polar or nonpolar.

<table>
<thead>
<tr>
<th>Shape</th>
<th>Lewis structure</th>
<th>Shape</th>
<th>Polar or nonpolar</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH₂O</td>
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<td></td>
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<tr>
<td>H₂SO₄</td>
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<tr>
<td>CO₃²⁻</td>
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<tr>
<td>BF₃</td>
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<tr>
<td>XeF₄</td>
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</table>
2. (10 points) Classify each of the following bonds as ionic, polar covalent, or nonpolar covalent. For polar covalent bonds draw an arrow pointing toward the more electronegative atom.

   a. K—Br ___________________
   b. Mg—S ___________________
   c. P—Br ___________________
   d. N—F ___________________
   e. C—H ___________________

3. (4 points) Write the balanced chemical equation for each of the following situations. Include the state of each reactant and product.

   b. Ammonia in solution and sodium hypochlorite in solution react to form chloroamine (NH₂Cl) as a gas and sodium hydroxide in solution. (This is the ammonia – bleach combination to avoid. Chloroamine and the others formed, including dichloroamine and trichloroamine are a combination of toxic and explosive.)

4. (4 points) Balance the following equations.

   a. \( \text{C}_7\text{H}_8 (\ell) + \text{HNO}_3 (aq) \rightarrow \text{C}_7\text{H}_5\text{N}_3\text{O}_6 (\ell) + \text{H}_2\text{O} (\ell) \) (formation of TNT)
   b. \( \text{C}_3\text{H}_8 (g) + \text{O}_2 (g) \rightarrow \text{CO}_2 (g) + \text{H}_2\text{O} (g) \) (burning of propane)