Chapter 1 Question Set:

1. How many valence electrons does each of the following elements have?
   - N  5
   - F  7
   - P  5
   - O  6

2. What is the valence of the following elements?
   - N  3
   - O  2
   - Br  1

3. Add in any formal charges (+/-):
   a) H3O+
   b) ![Image of molecule]
   c) ![Image of molecule]
   d) CH₃-O-CH₂CHCH₃

4. What is the hybridization of the atoms which are pointed to with arrows?
5. What is the molecular formula of compound A:

![Compound A](image)

Molecular Formula: C_{11}H_{9}NO

Chapter 2 Questions:

1. Label as Bronsted-Lowry Acid or Lewis Acid:

   a) 
   ![Diagram](image)
   Bronsted

   b) 
   ![Diagram](image)
   Bronsted

   c) 
   ![Diagram](image)
   Lewis

   d) 
   ![Diagram](image)
   Lewis

2. Label acid/base and conjugate acid/conjugate base:

   HCl + NaOH ⇌ HOH + NaCl
   acid  base  cong. Acid  conj. base

3. In Problem #2 above, assume pKa of HCl = -7 and pKa of HOH = 15.7. Which side of the equation is the equilibrium going to shift towards? The right side is favored because water has a higher pKa than HCl.
4. Label from decreasing pKa to increasing pKa:

\[ sp < sp^2 < sp^3 \]

Chapter 3 Questions:

1. Match the following:

- Aldehyde __f__
- Amine __e__
- Ketone __b__
- Alcohol __h__
- Amide __d__
- Thiol __a__
- Ester __g__
- Ether __c__

2. What is the resonance structure of compound A:

\[ \text{Compound A:} \]

3. Label as hydrophobic/ hydrophilic/ or both:

- a. NaCl __hydrophilic__
- b. __both__
- c. hexane __hydrophobic__
Chapter 4 Questions:

1. Name the following compounds:

   a. \text{pentane} \\

   b. \text{methane} \\

   c. \text{heptane} \\

   d. \text{propane} \\

   e. \text{undecane} \\

   f. \text{3-ethylhexane}

2. Draw the most stable Newman projection of pentane when looking down carbon 2 to carbon 3.
3. Draw the most stable chair structure for cis-1,3-dimethyl cyclohexane:

Chapter 5 Questions:

1. Draw all constitutional isomers of:
   a. C4H8
   b. 
   c. C5H12

2. Draw the mirror image and label chiral / achiral and whether it is an enantiomer, identical, etc.
   a. 
   b. 
   identical
3. Label all chiral centers as either R or S: