Chapter 1 Question Set:

1. How many valence electrons does each of the following elements have?
   N ____
   F ____
   P ____
   O ____

2. What is the valence of the following elements?
   N ____
   O ____
   Br ____

3. Add in any formal charges (+/-):
   a) H3O
   
   b) 
   
   c) 
   
   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: ____________________

Chapter 2 Questions:

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

   a) 
   \[
   \text{CH}_2\text{OH} \xrightarrow{B: \ominus} \text{CH}_2\text{O}^- \xrightarrow{\ominus} \text{BH} \]

   b) 
   \[
   \text{HCl} \xrightarrow{B: \ominus} \text{Cl}^- \xrightarrow{\ominus} \text{BH} \]

   c) 
   \[
   \text{BF}_3 \xrightarrow{\text{H}_2\text{O}} \text{BF}_3\text{O}^- \xrightarrow{\ominus} \text{OH}_2^- \]

   d) 
   \[
   \text{AlCl}_3 \xrightarrow{\text{Cl}} \text{Cl}^\ominus \xrightarrow{\ominus} \text{AlCl}_3^- \]

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

   \[
   \text{HCl} \quad \text{NaOH} \quad \text{HOH} \quad \text{NaCl} \]

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?

4. Label from decreasing pKa to increasing pKa:

   ![Diagram](image)
Chapter 3 Questions:

1. Match the following:
   
   Aldehyde ____
   Amine ____
   Ketone ____
   Alcohol ____
   Amide ____
   Thiol ____
   Ester ____
   Ether ____

2. What is the resonance structure of compound A:

   Compound A:

   ![Resonance structure](image)

3. Label as hydrophobic/ hydrophilic/ or both:

   a. NaCl

   b. ![Compound with a hydroxide ion](image)

   c. hexane

   ____________________________
Chapter 4 Questions:

1. Name the following compounds:
   
   a. ____________________________

   b. CH4 ____________________________

   c. ____________________________

   d. CH3CH2CH3 ____________________________

   e. ____________________________

   f. ____________________________

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. C5H12

2. Draw the mirror image and label chiral / achiral and whether it is an enantiomer, identical, etc.
   a. 
   ![Image of molecule]
   b. 
   ![Image of molecule]

3. Label all chiral centers as either R or S:
   ![Image of molecule]