Review Chapter 01

1. Draw Lewis structures of the compounds with the following molecular formulas:
   a) $\text{C}_3\text{H}_4$  
   b) $\text{HNO}_2$  
   c) $\text{HCO}_2\text{H}$

2. For each compound, state whether its bonding is ionic, covalent, or a mixture of ionic and covalent, then draw a Lewis structure to show the bonding in the compound:
   a) $\text{CH}_2\text{Cl}_2$  
   b) $\text{NaOCH}_3$  
   c) $\text{HCO}_2\text{Na}$

3. Complete the following Lewis structures by filling in lone pairs and calculating formal charges:
   a) 
   b) 

4. Each of the following compounds has a Lewis structure that violates the octet rule. Draw the octet rule violating Lewis structure, and briefly explain how and why it violates the octet rule:
   c) $\text{H}_3\text{PO}_4$  
   d) $\text{SOCl}_2$  
   e) $\text{B(CH}_3)_3$

5. Redraw each of the following fully condensed structures as partially condensed structures and as line structures:
   a) $\text{CH}_3\text{CH}_2\text{CHClCH}_2\text{CH}_3$  
   b) $\text{CH}_3\text{C(O)CH}_3$  
   c) $\text{CH}_3\text{C(CH}_3)_2\text{CH}_2\text{CH}_3$
6. Redraw each of the following Lewis structures as partially condensed structures and as line structures:

   d) \[
   \begin{array}{c}
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{O} \\
   \text{H}
   \end{array}
   \]

   c) \[
   \begin{array}{c}
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{C} \\
   \text{C} \\
   \text{C} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{Cl}
   \end{array}
   \]

7. Each of the following compounds or ions has resonance. Draw two resonance structures of each of the compounds:

   a) \( \text{NO}_2^- \)
   
   b) \([\text{CH}_2=\text{CH–CH}_2]^-\)

8. For each of the following structures, push electrons to create the indicated number of resonance structures. Label each structure as a major or minor contributor:

   a) \( \text{(ONE additional GOOD structures)} \)

   \[
   \begin{array}{c}
   \text{O} \\
   \text{H} \\
   \text{H} \\
   \text{CH}_3 \\
   \text{C} \\
   \text{CH}_2
   \end{array}
   \]
b) (TWO additional structures)

\[
\begin{align*}
\text{NH} \\
\text{NH}_2 - C - \text{NH}_2
\end{align*}
\]