REVIEW QUESTIONS
Chapter 10

1. Write Lewis structure for each ionic compound shown below:

   a) SrO
   
   b) CaI₂

2. Write the formula for the ionic compound formed from the combination of the elements indicated by the following Lewis symbols. (Note: formulas should be written in terms of X and Y and not actual elements, since their identity is not conclusively known).

   a) \( \cdot X \cdot \cdot Y \cdot \)
   
   b) \( \cdot X \cdot \cdot Y \cdot \)
   
   c) \( \cdot X \cdot \cdot Y \cdot \)
3. Draw Lewis structures and use VSEPR to predict the shape and bond angles and polarity for each of the following molecules or ions:

a) $\text{SO}_3^{2-}$

Shape: 

Bond angle: 

Polarity (Y/N): 

b) $\text{OCl}_2$

Shape: 

Bond angle: 

Polarity (Y/N): 

c) $\text{COCl}_2$

Shape: 

Bond angle: 

Polarity (Y/N): 

d) $\text{N}_3^-$

Shape: 

Bond angle: 

Polarity (Y/N): 

4. Determine what is wrong with each Lewis structure shown below, and write the correct structure.

a)  

\[
\begin{array}{c}
\text{H} - \text{H} - \text{H} - \text{N} : \\
\end{array}
\]

b)  

\[
\begin{array}{c}
\text{Cl} = \text{O} = \text{Cl} : \\
\end{array}
\]

5. Classify each of the following bonds as ionic, polar covalent or non-polar covalent:

a)  

\[
\begin{array}{c}
P - F \\
\end{array}
\]

b)  

\[
\begin{array}{c}
\text{Rb} - \text{Cl} \\
\end{array}
\]

c)  

\[
\begin{array}{c}
\text{N} - \text{O} \\
\end{array}
\]

6. Arrange the following bonds in order of increasing polarity:

\[
\begin{array}{ccccccc}
\text{N} - \text{O} & \text{Br} - \text{Cl} & \text{C} - \text{H} & \text{I} - \text{I} & \text{Zn} - \text{S} & \text{Li} - \text{F} \\
\end{array}
\]

least polar  <  <  <  <  <  most polar

7. For each bond below, determine the direction of the dipole and indicate by labeling the atoms with \( \delta^+ \) and \( \delta^- \) charges.

a)  

\[
\begin{array}{c}
\text{Si} - \text{Cl} \\
\end{array}
\]

b)  

\[
\begin{array}{c}
\text{C} - \text{N} \\
\end{array}
\]

c)  

\[
\begin{array}{c}
\text{F} - \text{Cl} \\
\end{array}
\]
8. Shown below is the Lewis structure for acetaldehyde molecule. Predict the shape and the bond angle of the molecule at each point indicated:

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

- carbon (*) shape:___________
- bond angle:__________
- carbon (**) shape:___________
- bond angle:__________

9. Complete each of the following statements with a suitable word or phrase:

a) Polarity of a bond is caused by _______________________________

b) Linear molecules with polar bonds are usually _______________

c) Molecules with 3 bonding pairs and 1 non-bonding pair of electrons around the central atom have a ________________shape.

d) Bonds that have unequal sharing of electrons are classified as ________________.

e) Molecules with 2 bonding pairs and 2 non-bonding pair of electrons around the central atom have a ________________shape.
ANSWERS:

1. No answers provided
2. a) \( X_3Y \)
   b) \( XY \)
   c) \( XY_3 \)
3. a) pyramidal; 109.5\(^\circ\); polar
   b) bent; 109.5; polar
   c) trigonal planar; 120\(^\circ\); polar
   d) linear; 180\(^\circ\); non-polar
4. No answers provided
5. a) polar covalent
   b) ionic
   c) non-polar covalent
6. No answers provided
7. No answers provided
8. carbon (*): tetrahedral; 109.5\(^\circ\)
   carbon (**): trigonal planar; 120\(^\circ\)
9. No answers provided