Answers to Homework: Lesson 09: Variations on Covalent Bonding, Exceptions to the Octet Rule

1. Read pages 177 – 178 (not shapes and polarity of molecules yet).
2. Do questions 14 – 17 on page 178.

Question 14, page 178: the answer on page 211 is clear and correct.
Question 15, page 178: the answer on page 211 is clear and correct.
Question 16, page 178:

Pl3 is drawn:  
\[
\begin{array}{c}
\text{P} \\
\text{I} \\
\text{I} \\
\end{array}
\]

ClI3 is drawn:  
\[
\begin{array}{c}
\text{Cl} \\
\text{I} \\
\text{I} \\
\end{array}
\]

Pl3 has only one lone pair on the central P atom, while ClI3 has two lone pairs on the central atom.

Question 17, page 178: the answer on page 211 is clear and correct.

3. Draw the molecular structure of the following molecules. Use the rules for exceptions to the octet rule (insufficient and expanded valence levels).

a) BI3  
\[
\begin{array}{c}
\text{B} \\
\text{I} \\
\text{I} \\
\end{array}
\]

b) IC{l}_2^{1-}  
\[
\begin{array}{c}
\text{I} \\
\text{Cl} \\
\text{Cl} \\
\end{array}
\]

c) CF3O2  
\[
\begin{array}{c}
\text{O} \\
\text{F} \\
\text{F} \\
\end{array}
\]

d) IOF5  
\[
\begin{array}{c}
\text{O} \\
\text{F} \\
\text{F} \\
\text{I} \\
\text{F} \\
\text{F} \\
\end{array}
\]

e) SOF4  
\[
\begin{array}{c}
\text{S} \\
\text{O} \\
\text{F} \\
\text{F} \\
\text{F} \\
\end{array}
\]

f) XeOF4  
\[
\begin{array}{c}
\text{O} \\
\text{Xe} \\
\text{F} \\
\text{F} \\
\text{F} \\
\end{array}
\]

g) CF4^{1+}  
\[
\begin{array}{c}
\text{Cl} \\
\text{F} \\
\text{F} \\
\text{F} \\
\text{F} \\
\end{array}
\]

h) IC{l}_4^{1-}  
\[
\begin{array}{c}
\text{Cl} \\
\text{I} \\
\text{Cl} \\
\text{Cl} \\
\end{array}
\]

i) XeF2  
\[
\begin{array}{c}
\text{F} \\
\text{Xe} \\
\text{F} \\
\end{array}
\]
j) BeH₂

k) IF₂O₂⁻¹

l) SF₄