PROBLEM 60 (cont.)

e) F: ⋅ ⋅ ⋅ ⋅ F: Doesn't obey the octet rule, more than an octet on Xe

F: ⋅ ⋅ ⋅ ⋅ F:

PROBLEM 62

a) There are three resonance structures for a configuration where O is the central atom, and three for a configuration where Cl is the central atom.

\[ \text{Cl} - \overset{\ddot{\text{O}}}{\text{O}} - \overset{\ddot{\text{O}}}{\text{O}} \leftrightarrow \text{Cl} - \overset{\ddot{\text{O}}}{\text{O}} - \overset{\ddot{\text{O}}}{\text{O}} \leftrightarrow \text{Cl} - \overset{\ddot{\text{O}}}{\text{O}} - \overset{\ddot{\text{O}}}{\text{O}} \]

Formal Charges:
\[
\begin{align*}
\text{Cl} & : +1 -1 \\
\text{O} & : 0 0 0 \\
\text{O} & : +1 0 -1 \\
\text{FC} & : -1 +2 -1
\end{align*}
\]

b) Because there is an odd number of valence electrons (19) there is no way to satisfy the octet rule.

c) Based on the formal charges above the most stable resonance structure is:

\[ \text{Cl} - \overset{\ddot{\text{O}}}{\text{O}} - \overset{\ddot{\text{O}}}{\text{O}} \]

because it minimizes the formal charge.

PROBLEM 67

a) \( \text{N} = \text{N} + 3 \text{H-H} \rightarrow 2 \text{H} = \text{N} - \text{H} \)

\[ \Delta H_{\text{rxn}} = \Sigma (\text{bonds broken}) - \Sigma (\text{bonds formed}) \]

\[ = \Delta H (N=N) + 3 \Delta H (H-H) - [6 \Delta H (N-H)] \]

\[ = 941 \text{ kJ/mol} + 3 \times 436 \text{ kJ/mol} - 6 \times 391 \text{ kJ/mol} \]

\[ = -97 \text{ kJ/mol} \]