

- Rank the following ions from *most acidic* to *most basic*. Explain your ranking.  
 $\text{As}^{3-}$ ,  $\text{Mo}^{6+}$ ,  $\text{V}^{3+}$ ,  $\text{Cl}^-$ ,  $\text{C}^{4-}$ ,  $\text{Pb}^{4+}$ ,  $\text{P}^{5+}$ ,  $\text{Po}^{6+}$ ,  $\text{O}^{2-}$ ,  $\text{Te}^{2-}$
- Which molecule has the larger bond angle,  $\text{SCl}_2$  or  $\text{SeF}_2$ ? Explain.
- Give the complete electronic configuration of As and the complete set of quantum numbers that describe a **3p-electron** in As. What is the effective nuclear charge,  $Z^*$ , felt by **the 4p and 3d electrons** in As? What relatively stable oxidation states (charges) would you expect to observe for an arsenic ion?
- The Aldrich Chemical Company catalog has a listing for “sodium antimonate,  $\text{NaSbO}_3$ ” and a listing for “potassium antimonate (hydrated),  $\text{KSb}(\text{OH})_6$ ”. Your textbook lists “Antimonate,  $\text{SbO}_6^{7-}$ ”. Calculate the  $\text{pK}_b$  for each of these formulas of “antimonate” and comment on the similarities and differences in their predominance diagrams. Which formula or formulas do you feel most accurately represents “antimonate” in aqueous solution? Explain.
- Draw Lewis structures and VSEPR shapes for the following. Name the electronic geometry around the central atom, calculate formal charges, and estimate the bond angles.  
 $\text{SeO}_3^{-2}$ ,  $\text{RnF}_3\text{Cl}$ ,