

# Bonding

Name: \_\_\_\_\_

1. Phosphorus reacts with Chlorine to form two compounds,  $\text{PCl}_3$  and  $\text{PCl}_5$ . What is the hybridization and shape for each molecule?
2. When Nitrogen reacts with Chlorine, only *one* compound ( $\text{NCl}_3$ ) is formed. Explain why Nitrogen is different from Phosphorus in this reaction.
3. What are the approximate bond angles in each of the following? Justify your answers.
  - a.  $\text{ONO}$  in  $\text{NO}_3^-$
  - b.  $\text{HPH}$  in  $\text{PH}_3$
  - c.  $\text{FSF}$  in  $\text{SF}_6$

4. What is the shape and the hybridization of the central atom for each of the following?

a.  $\text{SO}_3$

b.  $\text{XeF}_2$

c.  $\text{IF}_5$

d.  $\text{SeF}_6$

e.  $\text{ICl}_4^-$

f.  $\text{I}_3^-$



6. The bond angle for H-N-H in the Ammonia molecule is  $107^\circ$ , whereas the bond angle for H-P-H in the molecule  $\text{PH}_3$  is  $93^\circ$ . Explain:

a. Why the H-N-H bond angle is  $107^\circ$ .

b. Why the H-P-H bond angle is  $93^\circ$ .