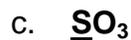


## Practice Problems

2. Draw the Lewis dot structures for each of the following molecules:



3. Draw the Lewis dot structure for each of the following polyatomic ions:



4. For the following molecules or ions (where the central atom is underlined):

- Draw the Electron dot structure.
- Determine the shape of the molecule.
- Determine the approximate bond angles.



c. phosphite ion,  $\text{PO}_3^{-3}$

5. For each of the bonds below:

- Use delta notation ( $\delta$  and  $\delta^-$ ) to indicate which atom is more electronegative, and
- Use an arrow to point from the less electronegative atom to the more electronegative atom.

C—Cl

N—O

H—O

6. Identify the type of bond described for each of the following as ionic, polar covalent, nonpolar covalent, or metallic.

\_\_\_\_\_ i. The C—O bonds in  $\text{CO}_2$ .

\_\_\_\_\_ iv. The C—C bonds in  $\text{C}_3\text{H}_8$

\_\_\_\_\_ ii. The bonds in  $\text{F}_2$ .

\_\_\_\_\_ v. The bonds in Ba.

\_\_\_\_\_ iii. The bonds in  $\text{K}_2\text{O}$ .

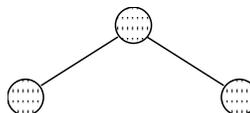
\_\_\_\_\_ vi. The bonds in  $\text{H}_2\text{O}$ .

7. Determine whether the following five molecules are polar or nonpolar:

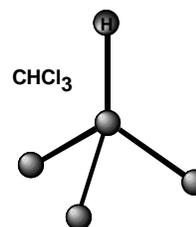
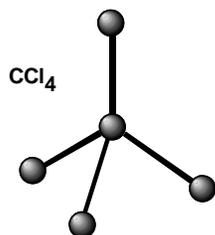
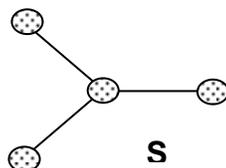
$\text{CO}_2$ :



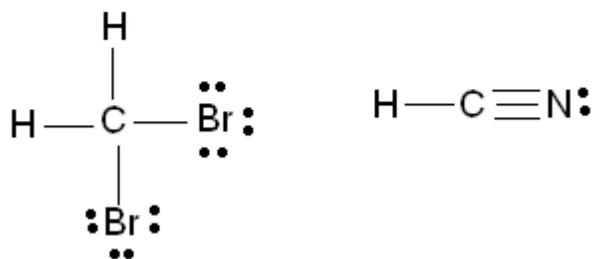
$\text{H}_2\text{O}$ :



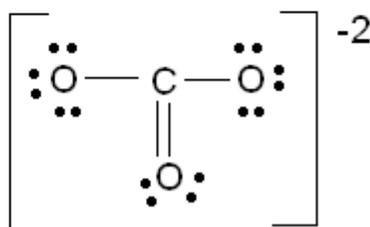
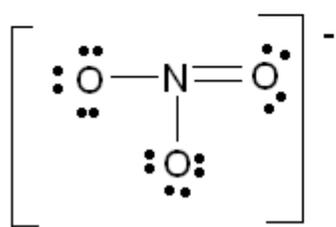
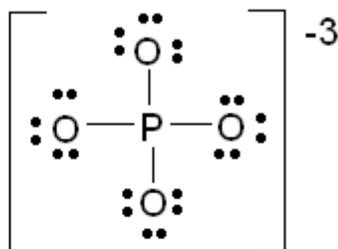
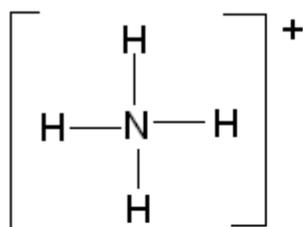
$\text{SO}_3$



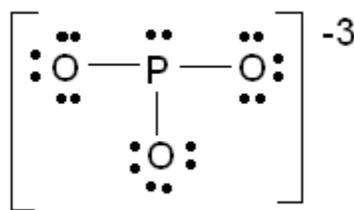
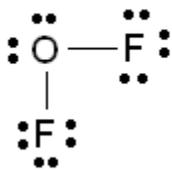
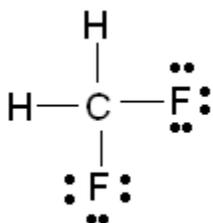
Answers



2.



3.



4.

$\text{AB}_4$ , tetrahedral,  $109.5^\circ$

$\text{AB}_2\text{E}_2$ , bent,  $<109.5^\circ$

$\text{AB}_3\text{E}$ , trigonal pyramid,  $<109.5^\circ$



6.       polar covalent    i. The C–O bonds in CO<sub>2</sub>.      nonpolar covalent    iv. The C–C bonds in C<sub>3</sub>H<sub>8</sub>  
         nonpolar covalent    ii. The bonds in F<sub>2</sub>.      metallic    v. The bonds in Ba.  
         ionic    iii. The bonds in K<sub>2</sub>O.         polar covalent    vi. The bonds in H<sub>2</sub>O.

7. CO<sub>2</sub> is nonpolar because the two polar bonds are equal and opposite so cancel out

H<sub>2</sub>O is polar because the bonds are not opposite and don't cancel out

SO<sub>3</sub> is nonpolar because the bonds are all the same and cancel out, the outer atoms all the same

CCl<sub>4</sub> is nonpolar because the bonds are all the same and cancel out, the outer atoms all the same

CHCl<sub>3</sub> is polar because the bonds are not the same and don't cancel out, the outer atoms are different