

Shapes and Intermolecular Forces

Name: _____

Period: _____

Complete the following table: You may want to draw the Lewis structure first.

Molecule	Shape	Angle	3-D Image	Bond Polarity	Molecular Polarity	Hybrid	Intermolecular Force
PO_4^{3-}							
BF_3							
H_2S							

Answer the following questions.

1. In methane (CH_4) what type of attractive forces exist between the atoms _____. What type of attractive forces exists between the methane molecules _____.
2. In water (H_2O) what type of attractive forces exist between the atoms _____. What type of attractive forces exists between the molecules _____.
3. In Nitrogen trifluoride (NF_3) what type of attractive forces exist between the atoms _____. What types of attractive forces exists between the molecules.
4. In NaCl what type of attractive forces exist between the atoms _____. Why would one not ask what type of forces exist between the molecules?
_____.
5. In Diamond what type of attractive forces exist between the carbon atoms _____. Why would asking what type of forces exist between molecules not make sense?
_____.
6. In a sample of Iron what type of attractive forces exist between the atoms_____.

7. In CS_2 what type of attractive forces exists between C and S _____. What is the total number of electrons shared between C and S _____. What is the force between carbon disulfide molecules? _____. How many sigma bonds exist in the entire molecule _____. What is the total number of pi bonds that exist in the molecule _____.
8. In Oxygen (O_2) how many sigma bonds exist _____. How many pi bonds _____. What is the type of force between the oxygen atoms _____ between the oxygen molecules _____.
9. In Nitrogen (N_2) how many sigma bonds exist? _____ Pi Bonds? _____. Which bond is longer the N_2 or the O_2 _____. Why? _____.
10. Rank the following molecules from highest boiling point to lowest (Strength of intermolecular forces): CH_4 , H_2O , PH_3 , LiBr , C (Diamond)

11. What has a higher melting point? SiCl_4 or SBr_2 ? _____ Why? _____
12. In Nitrate (NO_3^-), how many sigma bonds are present _____. Pi Bonds? _____
13. Sulfur forms bonds with oxygen in multiple ways. SO_3 , SO_2 , SO_3^{2-} and SO all exist. Rank them from longest bond to the shortest. _____