CHEM111 Week XX Recitation Name: _____
Molecular Shapes and Bond Angles Part II

1. Draw the Lewis structures for the three binary molecules listed below (XeF_4, BrF_5, and SF_6.)

XeF_4 **BrF_5** **SF_6**

2. Complete the chart below for each Lewis structure shown above.

	XeF_4	**BrF_5**	**SF_6**
Binary compound name			
Total number of valence Electrons			
Bonding Electron Pairs			
Lone Pairs around central atom			
Steric Number			
Electronic Geometry			
Molecular Geometry			
Predicted Bond Angle			

3. Compare the electronic and the molecular geometry for the molecules above. Explain any similarities and any differences in their electronic and molecular geometries.

Go to: https://chemapps.colostate.edu/dli/molecular-shapes/molecular-shapes-expanded.html and select the three molecules above. In the selection list below each molecule, turn the spin and hydrogens on. Turn everything else off.

4. How does your prediction about the molecular shape above compare to the actual shapes of each molecule? Note any differences and revise your answers above if necessary.

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5. Draw the 3D structure of each molecule in the space below using dash/wedge notation. Compare the shapes that you draw to those in the link above and modify your drawing if necessary. Is there anything present in your drawing that is NOT visible in the actual structure? Explain. Which is a more accurate depiction?

XeF_4 **BrF_5** **SF_6**

6. Turn off the spin for each molecule and measure the actual bond angles by double clicking on an outer atom, single clicking on the central atom, and single clicking on another outer atom to complete the bond. Record the bond angles for each molecule below and compare the actual bond angles to those you predicted in the chart. Revise your approximations in the chart if necessary but do not change approximations to the exact values reported below.

XeF_4 _____ **BrF_5 _____** **SF_6 _____**

7. Use the examples above to describe ideal bond angles versus non-ideal bond angles. When do ideal bond angles occur and when do the angles within a molecule deviate from ideal bond angles? Why?

8. Consider another binary fluoride compound, MgF_2. Draw the Lewis structure for this compound and write the name of the compound. (Hint: consider what type of compound this is before answering.)

9. Describe the similarities and differences in the bonding in MgF_2 compared to the bonding in the three molecules above. What property of the atoms involved in the bond creates a covalent versus an ionic bond? ("The combination of a nonmetal and a metal" is not a sufficient explanation.) Explain.