Bonding and Molecular Geometry Review

1. Identify the type of bond that would occur between the following elements
2. Mg & Cl b. Cu & P c. Zn & Zn d. C & P
3. Identify the subatomic particles involved in bonding (be specific) and use them to describe the difference between ionic, covalent, and metallic bonding.
4. Use Lewis Dot diagrams to show bonding occurring between the elements in question 1.
5. b.
6. d.
7. Draw the best Lewis Dot diagram (in 3 dimensions) for the following molecules including lone pairs and formal charges. Draw all resonance structures if applicable. Identify the electron and molecular geometry of the central atom and the label the bond angles on your diagram if the molecular geometry is not an expanded octet.
8. POCl2 3-D Lewis Dot Structure

EG:

MG:

1. SCN- 3-D Lewis Dot Structure

EG:

MG:

1. ClO3+ 3-D Lewis Dot Structure

EG:

MG:

1. AsBr3 3-D Lewis Dot Structure

EG:

MG:

1. (CH3)2CO 3-D Lewis Dot Structure

EG:

MG:

1. (CH3)2SO 3-D Lewis Dot Structure

EG:

MG:

1. SONH 3-D Lewis Dot Structure

EG:

MG:

1. SeO2Br- 3-D Lewis Dot Structure

EG:

MG:

1. AtF3Cl2 3-D Lewis Dot Structure

EG:

MG:

1. Draw the Lewis Dot structures for water and sulfur dioxide. Discuss similarities and differences between the structures.
2. Identify mistakes in the following Lewis Dot Structures
3. NO2
4. ClO3-
5. XeF4
6. Draw the Lewis Dot structure for a phosphate group and explain why it takes on the charge it does when acting as a polyatomic ion.
7. Explain the difference in bond angle observed for a BF3 molecule versus a BF2- molecule.
8. Discuss how electrons behave both as particles and as waves by explaining the photo electric effect and the dual-slit experiments.
9. What is meant by the terms destructive and constructive interference and how do they relate to bonding?
10. Draw a molecular orbital diagram for the bonding between carbon and oxygen and calculate the bond order. Write out the complete MO electron configuration for the molecule.
11. Draw a molecular orbital diagram for the bonding in a molecule of F2 and calculate the bond order. Write out the complete MO electron configuration for the molecule.
12. Explain the concepts of paramagnetism and diamagnetism and show how MO diagrams can predict these properties.
13. Identify the orbitals that make-up each type of sp hybridization: sp, sp2, sp3
14. For question 4, go back and identify the hybridization occurring around the central atom for structures a, b, & e.