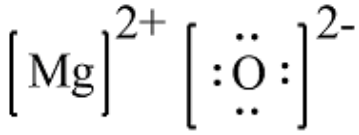
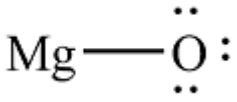
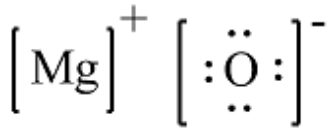
CHM151 Quiz 9a 25 Pts Spring 2013 Name: _____

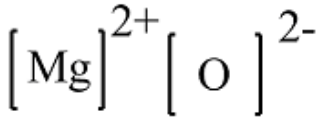
******You must provide a short explanation to justify each answer**** Due Wed. April 17th*****

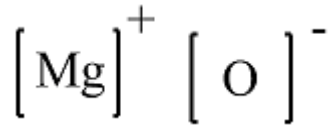
1. Which of the following is the Lewis dot structure for one formula unit of magnesium oxide?

A) 

B) 

C) 

D) 

E) 

2. An atom of which of the following elements has the smallest atomic radius?

A) Pb B) Po C) At D) Cs E) Bi

3. An atom of which of the following elements has the highest fourth ionization energy?

A) Al B) Ga C) Se D) As E) Si

4. Rank the following ions in order of decreasing ionic radius: S^{2-}, O^{2-}, F^{-}, Na^{+}, Mg^{2+}.

A) S^{2-}, O^{2-}, F^{-}, Na^{+}, Mg^{2+} **B**) O^{2-}, F^{-}, Na^{+}, Mg^{2+}, S^{2-}

C) Mg^{2+}, Na^{+}, F^{-}, O^{2-}, S^{2-} **D**) Mg^{2+}, S^{2-}, Na^{+}, F^{-}, O^{2-} **E**) O^{2-}, S^{2-}, F^{-}, Na^{+}, Mg^{2+}

5. Which of the following compounds would be expected to have the highest melting point?

A) LiF B) LiCl C) CsF D) NaBr E) CsI

6. Which of the following statements is true?
   A) The krypton 1s orbital is smaller than the helium 1s orbital because krypton's nuclear charge draws the electrons closer.
   B) The krypton 1s orbital is larger than the helium 1s orbital because krypton contains more electrons.
   C) The krypton 1s orbital is smaller than the helium 1s orbital because krypton's p and d orbitals crowd the s orbitals.
   D) The krypton 1s orbital and the helium 1s orbital are the same size because both s orbitals can have only two electrons.
   E) The krypton 1s orbital is larger than the helium 1s orbital because krypton's ionization energy is lower so it's easier to remove electrons.

7. From a consideration of the Lewis structure of the thiocyanate ion, SCN^-, in which carbon has a double bond with both the sulfur and nitrogen atoms, the formal charges on the sulfur, carbon, and nitrogen atoms are, respectively,
   A) –1, 0, 0. B) 0, 0, –1. C) –1, +1, –1.
   D) –2, +1, 0. E) –2, 0, +1.

8. Using bond-energy data, what is $\Delta H°$ for the following reaction?
   $CH_4(g) + 2Br_2(g) \rightarrow CBr_4(g) + 2H_2(g)$

Bond	Bond Energy (kJ/mol)
C-H	411
H-H	432
Br-Br	190
C-Br	285

   A) 20 kJ
   B) –20 kJ
   C) –262 kJ
   D) 262 kJ
   E) 1318 kJ

9. In general, atomic radii
   A) decrease from left to right in a period and increase down a group.
   B) increase from left to right in a period and decrease down a group.
   C) increase from left to right in a period and increase down a group.
   D) decrease from left to right and decrease down a group.
   E) do not change across a period or a group.

10. An atom of which of the following elements has the smallest ionization energy?
    A) Pb B) Cs C) At D) Bi E) Po

11. In which pair do both compounds exhibit predominantly ionic bonding?
    A) PCl_5 and HF B) Na_2SO_3 and BH_3 C) KI and O_3
    D) NaF and H_2O E) RbCl and CaO

12. Calculate the number of valence electrons for the phosphate ion and draw its Lewis structure.