CHM151 Quiz 9aa 25 Pts Fall 2010 Name: _

You must provide a <u>short</u> explanation to justify each answer. Due Friday Nov. 19

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

$$\begin{bmatrix} Mg \end{bmatrix}^{2+} \begin{bmatrix} \vdots \ddot{O} \vdots \end{bmatrix}^{2-} & Mg \longrightarrow \ddot{O} \vdots \\ B & Mg \end{bmatrix}^{+} \begin{bmatrix} \vdots \ddot{O} \vdots \end{bmatrix}^{-} & Mg \longrightarrow \ddot{O} \vdots \\ B & Mg \end{bmatrix}^{+} \begin{bmatrix} \vdots \ddot{O} \vdots \end{bmatrix}^{-} & Mg \end{bmatrix}^{2+} \begin{bmatrix} O \end{bmatrix}^{2-} \\ B & Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^{+} \begin{bmatrix} O \end{bmatrix}^{-} & Mg \end{bmatrix}^{-} \begin{bmatrix} O \end{bmatrix}^{-} \begin{bmatrix} Mg \end{bmatrix}^$$

- 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.

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 ΔH° for the following reaction?

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$CH_4(g)$ -	$+ 2Br_2(g) \rightarrow CBr_4(g) + 2H_2(g)$
Bond	Bond Energy (kJ/mol)
C-H	411
H-H	432
Br-Br	190
C-Br	285
A) 20 k	J
B) -20	kJ
C) -262	2 kJ
D) 262	kJ
E) 1313	8 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. The total number of valence electrons in the phosphate ion is A) 24. B) 26. C) 28. D) 30. E) 32.