**Quiz 8**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. For many years, it was believed that the noble gases could not form covalently bonded compounds. However, xenon reacts with fluorine and oxygen (10 points).
   1. Draw the Lewis structure for xenon tetrafluoride.



* 1. What is the orbital geometry around xenon tetrafluoride? \_\_octahedral
  2. What is the molecular geometry around xenon tetrafluoride? \_\_square planar
  3. What is the predicted hybridization of the xenon? \_sp3d2
  4. What is the predicted F-Xe-F bond angle? \_\_90°
  5. Would xenon tetrafluoride be considered polar or nonpolar? \_\_nonpolar

Reaction between xenon tetrafluoride and fluoride ions process the pentafluoroxenate anion:

XeF4 (g) + F- (g) → XeF5- (g)

* 1. The crystal structure of XeF5‑ compounds indicates a pentagonal bipyramidal orientation of valence pairs around Xe. Sketch the structure for XeF5-.



1. Use the Born-Haber cycle to calculate the lattice energy of potassium chloride from the following data (8 points):

Ionization energy of K (g) = 425 kJ/mol

Electron affinity of Cl (g) = -349 kJ/mol

Energy to sublime K (s) = 89 kJ/mol

Bond energy of Cl­2 (g) = 240 kJ/mol

∆Hf for K (s) + ½ Cl2 (g) → KCl­ (s) = -438 kJ/mol

K (s) → K (g) 89 kJ/mol

K (g) → K+ (g) + e- 425 kJ/mol

[Cl2 (g) → 2 Cl (g) 240 kJ/mol] × ½

Cl (g) + e- → Cl- (g) -349 kJ/mol

+ K+ (g) + Cl- (g) → KCl (s) ?

K (s) + ½ Cl2 (g) → KCl­ (s) -438 kJ/mol

-438 kJ/mol = 89 kJ/mol + 425 kJ/mol + ½ (240 kJ/mol) + -349 kJ/mol + ?

? = -723 kJ/mol

1. What is the difference between the equivalence point of a titration and the end point (2 points)?

The end point is when the indicator permanently changes color. The equivalence point occurs when all of the hydrogen ions have been neutralized.