Chemistry 141 Name key

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Quiz 8 (20 points) November 9, 2010

1. (4 points) Sodium atom are much larger than chlorine atoms, but in NaCl sodium ions are much smaller than chloride ions. Why?

Sodium atoms are much larger than chlorine atoms, because the electrons added after argon are in the next quantum level making it much larger.

Sodium ions are smaller than chloride ions because they are isoelectronic (have the same number of electrons), but sodium ions have more protons in the nucleus to pull the electrons closer making them smaller.

1. (8 points) Draw a Lewis Structure for the following, give the correct orbital and molecular geometry around central atom and tell the hybridization of the central atom. Show formal charges where appropriate.
	1. PH3

orbital geometry tetrahedral

molecular geometry – trigonal pyramidal

hybridization of P sp3

* 1. XeF5+1

orbital geometry octahedral

molecular geometry – square pyramidal

hybridization of P sp3d2

1. (4 points) Draw all resonance structures for N2O2, and be sure to show the formal charges for each structure.(draw as a linear skeleton structure with nitrogen in the center flanked by the oxygens)

No formal charge – best structure

Some separation of charge, not as good, but OK

YUK!! Too much charge and the electronegative oxygen has a + charge

1. (4 points) Draw Lewis structure for NOF3 and POF3 in which the group 15 element is the central atom and the other atoms are bonded to it. What differences are there in the types of bonding in these molecules?

Because phosphorus has the ability to expand its octet, it can eliminate the formal charges on all atoms.