## **Answers to Chapters 8 & 9 Study Questions**

- 1. a) 6 b) 1 c) 3 (two s electrons and one p electron)
- 2. in order of increasing electronegativity: Ge < C < O
- 3. a) Li<sup>+</sup> b) Na<sup>+</sup>
- 4. O<sup>2-</sup>, F<sup>-</sup>, Na<sup>+</sup>, Mg<sup>2+</sup>, Al<sup>3+</sup> b) S<sup>2-</sup>, Cl<sup>-</sup>, K<sup>+</sup>, Ca<sup>2+</sup>, Sc<sup>3+</sup> c)  $\Gamma$ , Cs<sup>+</sup>, Ba<sup>2+</sup>
- 5. isoelectronic
- н-S-H : Br-Br: c) H-N-H d) П : I-C-H 6. a)
- 7. a) bent, polar c) trigonal pyramid, polar d) tetrahedral, polar
- H-C-C-C-H or H-C-C=C-H 8.
- 9. Covalent bonds involve the sharing of electrons between two atoms (usually nonmetals). The orbitals of bonding electrons overlap so that the bonding electrons spend more time between the 2 atoms. A bond is polar when one of the atoms is more electronegative than the other atom. A molecule is polar when the overall molecule has a net dipole moment, that is, electrons spend more time on one side of the molecule than the other.
- 10. Chemical properties are shared within a Group but not within a Period. Group number is a good predictor of chemical properties; Period number is not.
- 11. a) C Fb) Si – F
- 12. a) see-saw b) square planar c) trigonal bipyramid d) octahedral
- b) sp c)  $sp^{3}d^{2}$ d)  $sp^3d$ e)  $sp^2$ 13. a)  $sp^3$ f)  $sp^2$
- 14. a) 4 sigma bonds b) 3 sigma bonds, 1 pi bond
  - c) 2 sigma bonds, 2 pi bonds d) 9 sigma bonds, 1 pi bond