

**Fall 2001: PSC2121 Homework Assignments
Solutions due Nov 1, Ch. 13 and 14**

Ch. 13:

1. (a) lead. (b) tin. (c) mercury. (d) silver. (e) silicon.

2. (a) K (b) Na (c) P (d) Al (e) F

5. (a) ^{19}F 9 electrons 9 protons 10 neutrons
 (b) ^{32}S 16 electrons 16 protons 16 neutrons
 (c) ^{75}As 33 electrons 33 protons 42 neutrons
 (d) ^{88}Sr 38 electrons 38 protons 50 neutrons
 (e) ^{201}Hg 80 electrons 80 protons 121 neutrons

10. (a) N has 7 protons, so mass 13 gives $13-7 = 6$ neutrons.
 (b) K has 19 protons, so mass 41 gives $41-19 = 22$ neutrons.
 (c) Pb has 82 protons, so mass 207 gives $207-82 = 125$ neutrons.

19. (a) 4 electrons = beryllium.
 (b) Ne + 1 electron = sodium.
 (c) Ar + 9 electrons = cobalt.
 (d) 35 electrons = bromine.
 (e) Kr + 14 electrons = tin.

31. Atoms in the third period contain consecutive electrons filling the $n=3$ levels (s then p).

32. Members of the nitrogen family (column V) all have $[]s^2p^3$ configuration of outer electrons corresponding to a Lewis dot diagram with 5 dots.

35. A. (c) B. (c) C. (a) D. (d) E. (d) F. (b) G. (c) H. (b) I. (b) J. (c)

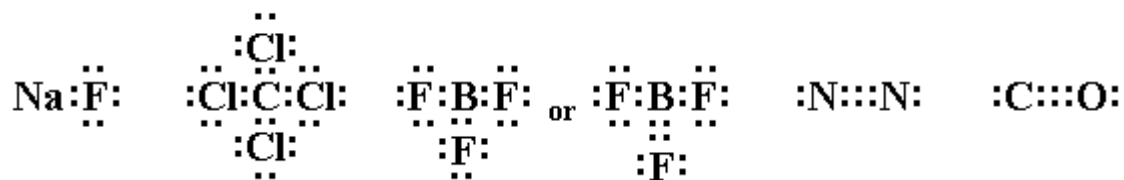
Ch. 14:

1. Helium **He**, Neon **Ne**, Argon **Ar**, Krypton **Kr**, Xenon **Xe**, Radon **Rn**

4. The number of dots is given by the column in the period table:



6. Try to "share" dots to get 2 (for Na) or 8 around each element.
 In some cases, double or triple bonds are needed. BF_3 has 2 possibilities.



10. (a) S = group VI, 6 electrons.
 (b) C = group IV, 4 electrons.
 (c) Mg = group II, 2 electrons.
 (d) Ne = group VIII, 8 electrons.
 (e) B = group III, 3 electrons.
24. (a) F forms a single covalent bond. (b) O forms 2. (c) N forms 3. (d) C forms 4.
31. Use electronegativity values for prediction:
 Br = 2.8, F = 4.0, Li = 1.0, Na = 1.0, K = 0.9, S = 2.5, N = 3.0, Ne = inert
 (a) Br and F, difference = 1.2, **polar covalent**.
 (b) Li and Na, difference = 0.0, predicts non-polar covalent,
 but these are metals so expect **metallic bond**.
 (c) K and S, difference = 0.6, **polar covalent**.
 (d) N and Ne, Ne is inert so expect **no bond**.
40. Cu forms metallic bonds in which the outer electrons are shared between all atoms and the electrons can flow easily.
46. A. (d) B. (c) C. (a) D. (c) E. (c) F. (d) G. (c) H. (a) I. (a) J. (b)