

Unit Review

pg. 264 #3-15,17,18,19,28,40,41,45,46

3d 4e 5e 6a 7a 8c 9c 10b 11e 12e 13a 14b 15d

17. a. Bohr's model explained the observed line spectra of hydrogen.
- b. Bohr's model says that the energy, and therefore the radius of the orbit, of electrons are quantized. Atoms do emit energy in the form of electromagnetic radiation but only in specific quanta which are emitted when an electron drops from one allowed orbit to another allowed orbit.
- c. The Bohr model could not explain the more complex spectra of atoms larger than hydrogen.
18. As the atomic number increases, the positive effective charge in the nucleus increases, which increases the attractive force on the electrons, pulling them closer to the nucleus.
19. The aufbau principle states that each electron occupies the lowest energy orbital available. Thus, when filling orbitals in an orbital diagram, place electrons on the lowest energy orbital. When there are several equal-energy orbitals available, follow Hund's rule which states that each equal-energy orbital receives one electron before any pairing occurs. Also, when equal energy orbitals are being filled, the electrons must all have the same spin.
28. (electron group arrangement; molecular shape)
 - a. octahedral; square pyramidal
 - b. trigonal bipyramidal; seesaw
 - c. trigonal bipyramidal; linear
 - d. tetrahedral; trigonal pyramidal
 - e. octahedral; square planar
 - f. tetrahedral; tetrahedral
40. The shape around all of the carbon atoms is trigonal planar, therefore, the molecules themselves are planar. The grey/light arrows show the direction of the polarity of each individual bond. 2 isomers are polar and 1 is nonpolar
- 41.
- 45.a. SnF_4 tetrahedral-tetrahedral
- b. H_3O^+ tetrahedral-trigonal pyramidal
- c. AsF_5 trigonal bipyramidal - trigonal bipyramidal
- d. ICl_2^- trigonal bipyramidal - linear

46. **a.** H_2O : H_2O forms hydrogen bonds whereas H_2S does not. Therefore, the intermolecular forces holding H_2O molecules are stronger.
- b.** Based on structure SCl_4 is see-saw shaped and would be polar versus SiCl_4 is tetrahedral and nonpolar. Therefore SCl_4 would have DDF and LDF and SiCl_4 only LDF.
- c.** C_8H_{18} : Both molecules are non-polar but octane is larger and will thus experience greater LDF.