Unit 1 - Quantum Theory Review

1. Atomic Structure History – focus primarily on the “new Stuff”
   1. ‘n’ principal quantum number n=1,2,3… (energy)
   2. ‘l’ orbital number (secondary) l = 0 – (n-1) (shape)
   3. ml magnetic quantum number –l ≤ ml ≤ l (orientation)
   4. ms spin quantum number ms = ±1/2 (electron spin)
   5. should be able to assign quantum #’s to any element based on it’s position on the PT and vice versa.
2. Orbital Fill Diagrams
   1. Aufbau diagram – must fill electrons starting from the lowest energy level and orbital
   2. Hund’s rule – one electron occupies each of the orbitals before a second electron can be placed
   3. Pauli exclusion principle – no 2 electrons can have the same set of 4 quantum numbers.
   4. Kernel method – short form notation using the previous noble gas as the core.
   5. Electron configurations – both atoms and ions
3. Bonding
   1. Lewis Theory
      1. octet rule
      2. How to draw LD diagrams for more complex molecules/ions.
   2. Valence Bond Theory
      1. ½ filled orbitals overlap to create bonds
      2. Electrons can be promoted to higher energy orbitals to create ½ filled orbitals for bonding.
4. Hybrid Orbital Theory
   1. Blending of ½ filled orbitals for the purpose of bonding.
   2. Helps to predict shape and explain how multiple bonds are created.
   3. Sigma (σ) and pi (π) bonds
5. VSEPR Thoery
   1. predicts shape around central atom by looking at the electron pairs around the central atom (Lewis)
   2. base shapes and variations
6. Polar Molecules and Interparticle Bonding
   1. The polarity can be determined by looking at symmetry (shape) predicted by VSEPR and polarity of the bonds.
   2. Interparticle bonding and characteristics can be determined by the polarity of the molecule.

**Key Concepts** from the unit can be found on pages 132 & 192

Key Vocabulary from the unit can be found on pages 184 &260

Review Questions

Page 270 #9-24, 32-42

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