

Study Notes

1. Acids and Bases

- Acids turn red litmus paper blue
- Bases turn blue litmus paper red
- Solutions that are acidic or basic can conduct electricity
- Acidic solutions have a free hydrogen ion (H^+)
- Basic solutions have a free hydroxide ion (OH^-)

2. Solutions

- Pure or distilled water cannot conduct electricity
- Aqueous solutions containing a molecular solute cannot conduct electricity
- Acidic, basic and ionic aqueous solutions can conduct electricity.
- Note that not all ionic compounds can dissolve in water. Such compounds will precipitate out of water.
- For a reaction such as $Hg(NO_3)_2 + NaBr \rightarrow HgBr_2 + 2NaNO_3$, $HgBr_2$ will precipitate out because it is not water soluble. See solubility table on the periodic table of ions

3. Periodic table

- Review the characteristics of a periodic table.
- Elements in the same group/column have similar characteristics, in part because they have the same number of valence electrons. Examples Group 1A (H, Li, Na, K) and Halogens/7A (F, Cl, Br)
- Atomic Notation
 - $^{16}_8O$, $^{17}_8O$, $^{18}_8O$ represent the three isotopes of oxygen, also expressed as Oxygen-16, Oxygen 17 and Oxygen 18
 - $^{16}_8O$ The 16 represents the mass number (number of protons and neutrons) and the 8 represents the atomic number (number of protons).

4. Molecular compounds

- Know the different shapes. See Figure 8.18 on page 233. Make sure you know the shape of compounds covered in the textbook and discussed in class such as methane, water and ammonia. Review worksheet ChemQuest 27.
- Review Lewis Dot/Electron dot diagrams (table 7.1 on p188). Remember that each dot represents a valence electron.

5. Ionic Compounds

- Remember to use Roman Numerals (I, II, III) when naming ionic compounds which have multivalent metals such as Iron (II) oxide (FeO) and Iron (III) oxide (Fe_2O_3). Remember to check with your periodic table of ions.
- Be able to convert IUPAC names to Formulas and vice versa.

6. Chemical Reactions

- a. Identify Five types of Chemical Reactions
 - i. Decomposition
 - ii. Formation/syntheses
 - iii. Single Replacement
 - iv. Double Replacement
 - v. Combustion
- b. Know how to balance chemical reactions
- c. Predict products
- d. Molecular compounds are held together by molecular bonds. Molecular compounds consist of two non-metals
- e. Ionic compounds are held together by ionic bonds. Ionic compounds consist of metal/non-metals or metals/polyatomic metals.

7. Electron Configuration

- a. The electron configurations written on the periodic table are in abbreviated form. They also represent ground state configuration. Ex. The electron configuration for the ground state of Phosphorus is $1s^2 2s^2 2p^6 3s^2 3p^3$. Note the textbook periodic table has the numbers 2, 8 & 5 written in a column. Energy level one has **2** electrons. Energy level two has 8 electrons and energy level three has **5** electrons. Phosphorus has five valence electrons.

8. Solutions

- a. Molarity (M) = moles/liter
 - i. Dissolve 5 moles of NaOH in 2 liters = $5\text{ moles}/2\text{ liters} = \mathbf{2.5 M}$
 - ii. Dissolve 5 moles in 750ml. Convert ml to L. So 5 moles in 0.750 l = **6.67 M**
 - iii. Dissolve 5 grams of NaCl in 2 liters. The number of grams must be converted to moles first. Then follow (i).
 - iv. Review the definition of mixtures (homogenous and heterogeneous), elements and compounds.

9. Stoichiometry

- a. Review all stoichiometry calculations. I will place some on the blog later tonight.