**Unit 2, Chemistry. Review Guide 2013**

I: Matter:

 A. Atom

 B. Element

 C. Compound

 D. Molecule

II: Isotopes & Ions

 A. Parts of atoms

 1. nucleus

 a. proton:

 b. neutron:

 c. isotope:

 d. atomic number:

 e. atomic mass:

 f. ion:

 2. electron cloud

 a. electron:

 a. energy levels and electronic structure:

III: Types of Bonds

 A. Covalent:

 B. Ionic:

 C. Polar Covalent:

 D. Hydrogen:

IV: Water & Solutions

 A. Water

 1. Special properties

 a.

 b.

 c.

 d.

 2. Cause of special properties:

 B. Solutions

 1. solvent:

 a. aqueous solution:

 b. non-aqueous solution:

 2. solute:

 a. saturated solution

 b. concentration

 C. pH

 1. pH scale (acids and bases)

 2. Hydronium:

 3. Hydroxide:

 4. Relative concentration problems (e.g. pH 5 vs. pH 8, what is the difference in hydronium concentration)

 5. Buffer

V. Organic chemistry

 A. define and identify organic compounds.

 B. Carbon

 1. valence electron structure

 2. # and types of bonds carbon makes

 C. Carbon compounds

 1. polymer (define)

 2.monomer (define)

 3. Dehydration synthesis reaction

 a. polymerization problems (i.e. 7 glucose molecules form a straight chain…)

 4. hydrolysis reaction

 5. Functional Groups

|  |  |  |
| --- | --- | --- |
| Chemical Structure | Functional group | Compounds |
| -OH |  |  |
|  | Carbonyl |  |
|  |  | Carboxylic acids |
| -NH2 |  |  |

 E. hydrocarbons (define)

 i. alk**a**nes / ii. Alk**e**nes / iii. alk**y**nes

VI. Macromolecules

 A. definition

B. 4 types:

|  |  |  |
| --- | --- | --- |
| Macromolecule | Monomer / subunits | Functions |
| Carbohydrates |  |  |
|  | Amino acids |  |
|  |  | Cell membrane material, store long-term energy reserves |
| Nucleic Acids |  |  |

C. Carbohydrates

 1. Basic structure of a monosaccharide:

 a. C:H:O ratio:

 b. glucose chemical formula:

 c. define isomer

 2. define disaccharide

 3. define polysaccharide

 a. polysaccharide example #1: Cellulose

 i. where it is found

 ii. what it is / does

 b. polysaccharide example #2: Glycogen

 i. where it is found

 ii. what it is / does

 c. polysaccharide example #3: Starch (amylose)

 i. where it is found

 ii. what it is / does

 D. Proteins

 1. Basic structure of an amino acid

 a. functional groups

 b. R-group

 c. number of different types

 2. Polypeptide (define)

 3. Protein (define)

 a. enzyme (define)

 b. structural protein (define)

 4. Protein structure

 a. primary structure:

 b. secondary structure:

 i. ii.

 c. tertiary structure:

 d. quaternary structure:

 5. Energy and enzymes

 a. activation energy

 b. lock and key / induced fit

 c. substrate specificity

 d. factors that affect enzyme function

 i. temperature

 ii. pH

 iii. substrate concentration

 E. Nucleic Acids

 1. Basic structure of a nucleotide (draw)

 a. 3 parts

 i.

 ii.

 iii.

 b. DNA vs RNA nucleotides – what’s different?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Nucleic Acid | # strands | sugar | bases | Function |
| DNA |  |  |  |  |
| RNA |  |  |  |  |

 2. Characteristics of DNA & RNA

 a. structural differences:

 i.

 ii.

 b. functional differences

 i.

 ii.

 c. importance of H-bonds

 F. Lipids

 1. defining characteristic of a lipid:

 2. unique structure among macromolecules:

 3. Most important role in all cells:

 4. types:

 a.

 b.

 c.

 d.

 5. Membrane phospholipids (describe hydrophilic and hydrophobic arrangement)