**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)