Chemistry: Quick reference

vishvAs vAsuki

January 25, 2010

Part I
Elements and the atomic theory

1 Atomic theory of matter

All elements are combinations of around 130 elements in different proportions. Each element has a certain chemical property.

2 Orbitals

s1, s2, p1, p2, p3, q, r. s is spherical, p is octal-shaped. Hybrid orbitals sp1 etc..

Part II
Physical structure of matter

3 Molecular structure

3.1 Notation

(Lewis) Letters represent various atoms; Dots represent valence electrons, possibly shared. .O:H.

Or, can use 1/2/3 dashes to represent single/ double/ triple bonds.

3.1.1 3-D structures

Can use 'Newman projection' diagrams.

Part III
Dynamics of chemical reactions

4 Low level view

Chemical reacion involves making and breaking of bonds; which requires atoms to collide. The former usually has to happen first: this requires an activation energy. This can be supplied with heat, light etc..

5 Grosser view

Reactions can be endothermic or exothermic.

Part IV
Organic chemistry

Hydrocarbons. Aliphatic vs aromatic compounds. Aliphats can be alkanes, alkenes or alkynes. Functional groups in hydrocarbons: -NH2 or =O-OH.

Part V
Proteins

6 Protein structure

A chain of amino acids. Amino acids are 20. $H_3N - C_\alpha(R)(CH_3) - COOH$. $COO - H_2N$ is the peptide bond: Just the right strength for biological activity: not too strong, not too weak.

7 Protein folding

[**Incomplete**]