

I.

ATOMIC STRUCTURE

ATOMS; ELEMENTS

- NUCLEUS - PROTONS (POSITIVE)
- NEUTRONS (NEUTRAL)

ELECTRONS (NEGATIVE)

ATOMIC NUMBER - # OF PROTONS

ATOMIC WEIGHT - # OF PROTONS PLUS NEUTRONS

ELECTRON SHELLS - ELECTRONIC CONFIGURATION

SHELLS GOING FROM NUCLEUS OUTWARD 2,8,8

NUMBER DONATED, ACCEPTED or shared ELECTRONS is called VALENCE

MOLECULE - at least 2 atoms, H₂, O₂, H₂O

COMPOUND - at least 2 different kinds of atoms, H₂O, CH₄

MOLECULAR WEIGHT - SUM OF ATOMIC WEIGHTS

H₂O H 2 X 1 = 2

 O 1 X 16 = 16

 Molecular Weight 18

MOLE - 6.023×10^{23} molecules; MOLECULAR WEIGHT in grams

II.

CHEMICAL BONDS

- A. IONIC BONDS - donate electrons, receive electrons
- B. COVALENT BONDS - sharing electrons
- C. HYDROGEN BONDS - attraction of partial positive and partial negative charges
 - unequal distribution of charges in the molecule
 - polarity of water

III.

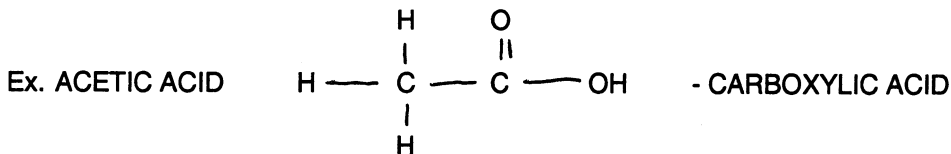
WATER, SOLVENT, SOLUTE, DISSOCIATION

- A. ACIDS H^+ and ANION (OTHER THAN OH^-) (PROTON DONOR)
 $HCl \rightleftharpoons H^+ + Cl^-$
- B. BASE CATION (OTHER THAN H^+) + OH^- (PROTON ACCEPTOR)
 $NaOH \rightleftharpoons Na^+ + OH^-$
- C. SALT CATIONS + ANIONS OTHER THAN H^+ or OH^-
 $NaCl \rightleftharpoons Na^+ + Cl^-$

IV.

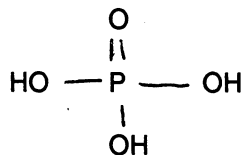
CLASSES of ORGANIC CHEMICALS - CARBON SKELETONS - FUNCTIONAL GROUPS

A. ACIDS

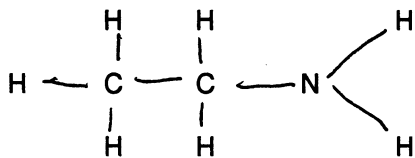


$$\begin{array}{l}
 2C \text{ at } 12 = 24 \\
 2O \text{ at } 16 = 32 \\
 4H \text{ at } 1 = 4 \\
 \hline
 60 \text{ MOL WEIGHT}
 \end{array}$$

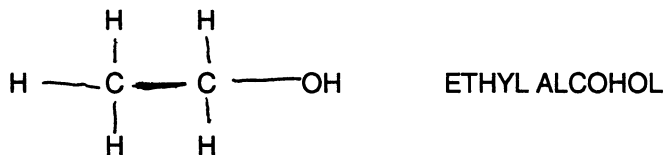
PHOSPHORIC ACID



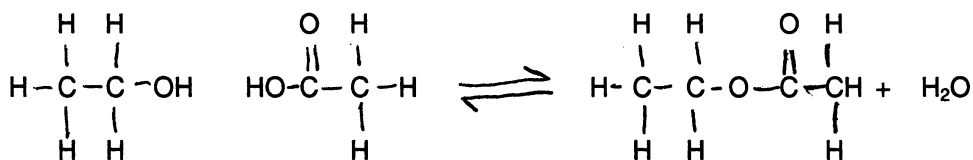
B. AMINES- NH_2 ; ETHYLAMINE



C. ALCOHOLS- OH ; HYDROXYL GROUP



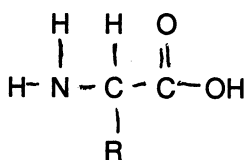
D. ESTERS ALCOHOL + ACID ESTER + H_2O



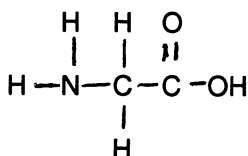
V.

LOW MOLECULAR WEIGHT BUILDING BLOCKS - PRECURSORS

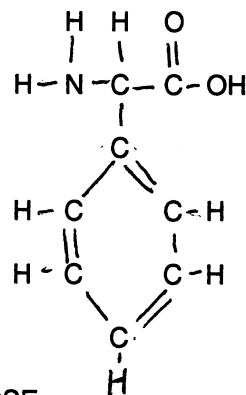
A. AMINO ACIDS



GLYCINE



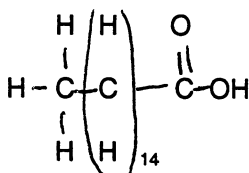
PHENYLALANINE



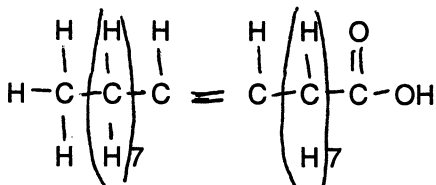
PEPTIDES, PROTEINS

B. SUGARS (CH₂O)_n - MONOSACCHARIDES - GLUCOSE
 POLYSACCHARIDES (STARCH) DISACCHARIDES - SUCROSE

C. FATTY ACID - SATURATED - PALMITIC ACID



UNSATURATED - OLEIC ACID



LIPIDS (GLYCEROL PHOSPHATE, PHOSPHOLIPIDS)

D. NUCLEOTIDES - BASE: PURINES: ADENINE, GUANINE
 PYRIMIDINES: THYMINE, URACIL, CYTOSINE
 SUGARS: DEOXYRIBOSE, RIBOSE
 PHOSPHATE; NUCLEOSIDE, NUCLEOTIDE

VI.

MACROMOLECULES - PROTEINS, POLYSACCHARIDES, LIPIDS, POLYNUCLEOTIDES, DNA, RNA.

- A. PROTEINS: AMINO ACIDS, PEPTIDE BONDS
- B. POLYSACCHARIDES: CHAINS OF MONO- OR DISACCHARIDES
- C. LIPIDS/PHOSPHOLIPIDS
 FATTY ACIDS PLUS GLYCEROL/ FATTY ACIDS PLUS GLYCEROL PHOSPHATE
- D. NUCLEIC ACIDS (POLYNUCLEOTIDES)
 RNA/DNA