

## NOTES I

## CHEM NOTES - ORGANIC CHEMISTRY

Name: \_\_\_\_\_

I. Organic Chem - the study of the carbon and its compounds.

II. Characteristics of Organic Compounds

- A. They are usually nonpolar.
- B. They are usually insoluble in water.
- C. They are generally nonelectrolytes.
- D. They have low melting points.
- E. They react slower than inorganic compounds.
- F. They often require high activation energies.
- G. They are covalent compounds that are molecular in structure.

III. Hydrocarbons - organic compounds that consist only of atoms of the elements \_\_\_\_\_ and \_\_\_\_\_

A. Homologous series - a group of related compounds in which each member differs from the one before it by the same additional unit.

1. Alkanes - homologous series of saturated hydrocarbons.

a) Saturated compounds contain only \_\_\_\_\_ bonds.

b) The general formula of the alkane series is \_\_\_\_\_.

c) Each succeeding member differs from the compound before it by a \_\_\_\_\_ unit.

d) The first member of the alkane series is  $\text{CH}_4$ . It is called \_\_\_\_\_ and has the structural formula:

e) The second alkane,  $\text{C}_2\text{H}_6$ , \_\_\_\_\_, with the structure:

f) The third alkane,  $\text{C}_3\text{H}_8$ , is \_\_\_\_\_ with the structure:

g) The fourth member of the alkane series,  $C_4H_{10}$ , named \_\_\_\_\_ has more than one structural formula. When a compound has the same molecular formula but a different structural formula it is called an \_\_\_\_\_.  
The structures are names of the 2 isomers of butane are:

h) Prefixes: 1 carbon = meth    2 carbons = eth  
                  3 carbons = prop    4 carbons = but  
                  5 carbons = pent    6 carbons = hex  
                  7 carbons = hept    8 carbons = oct  
                  9 carbons = non    10 carbons = dec

Names of alkyl groups (organic radicals):

$CH_3$  = methyl

$C_2H_5$  = ethyl

$C_3H_7$  = propyl

$C_4H_9$  = butyl

i) Give the structural formulas for the following compounds:

1) n-pentane

2) 3 ethyl pentane

3) 2,3 dimethyl hexane

2. Alkenes - homologous series of unsaturated hydrocarbons containing one double bond ( $C=C$ ).

The general formula of this series is  $C_nH_{2n}$ .

a) The first member of this series is  $C_2H_4$  and is named \_\_\_\_\_ or \_\_\_\_\_.

b) The second member of the alkene series has the molecular formula, \_\_\_\_\_, and is named \_\_\_\_\_.

c) The third member of the series has the molecular formula, \_\_\_\_\_. It has 3 possible isomers in this group. Name and give the structures of these 3 isomers.

3. Alkynes - homologous series of unsaturated hydrocarbons that contains one triple bond ( $C\equiv C$ ).

The general formula of this series is  $C_nH_{2n-2}$ .

a) The 1<sup>st</sup> member of this series has the formula \_\_\_\_\_ and is named \_\_\_\_\_ or \_\_\_\_\_.

b) The 2<sup>nd</sup> member has the formula \_\_\_\_\_ and the name \_\_\_\_\_.

4. Alkadienes - homologous series of unsaturated hydrocarbons that have 2 double bonds per molecule.

a) This series of compounds has the general formula,  $C_nH_{2n-2}$ .

b) One common member of this series is 1,3 butadiene, with the structural formula shown below:

5. Benzene series - homologous series of cyclic hydrocarbons.

a) They are unsaturated compounds with the general formula  $C_nH_{2n-6}$ . They are also known as aromatic hydrocarbons.

b) The simplest member of this series is benzene with the molecular formula, \_\_\_\_\_.

c) The structural formula for benzene can be written in more than one way as shown below:

d) The 2<sup>nd</sup> member of the benzene series has the molecular formula, \_\_\_\_\_, and is called \_\_\_\_\_ or \_\_\_\_\_.  
Draw its structural formula below: