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Diploma in Pharmacy 1st Year
Pharmaceutical Chemistry
Important Questions
Chapter 4 : Organic chemistry

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Chapter 4

Organic chemistry

IMPORTANT Questions

Q1. Write a detailed note on IUPAC system of nomenclature also explain the nomenclature of compound containing functional group.

Ans.

IUPAC System of Nomenclature

- The International Union of Pure and Applied Chemistry (IUPAC) put forward a systematic method of naming organic compounds; this method is termed IUPAC nomenclature. This method eases the identification of different compounds. Each and every organic compound should be named so that their structural formula can be drawn.

Rules Governing IUPAC Nomenclature of Branched Chain Alkanes

Branched chain alkanes can be named by the given rules of IUPAC nomenclature system:

- The longest continuous chain of carbon atoms is identified as the parent chain and the compound is considered its derivative
- The carbon atoms in the parent chain are numbered from one end so that the substituents carrying carbon atoms receive the lowest numbers
- For naming the organic compounds the position of each substituent and its name of parent alkane
- The names of different alkyl substituents present in the parent chain are written alphabetically
- If the parent chain has two or more substituents at equivalent position the first substituent in the alphabetical order is given the lowest number
- In the presence of two or more same substituents their number position is separated by commas and the appropriate prefix-di, tri, tetra, etc., are added to the name of each.
- If the substituent also carries a branched chain the carbon in the chain are numbered separately beginning from the carbon attached to the parent chain. The names of such complex substituents are written within brackets

Nomenclature of compound Containing Functional Groups

The functional group (apart from C=C and C≡C) present in a molecule is written by adding secondary suffix after the primary suffix. The 'e' terminal of the primary suffix is removed before the secondary suffix is added if its name begins with a, i, o, u, or y.

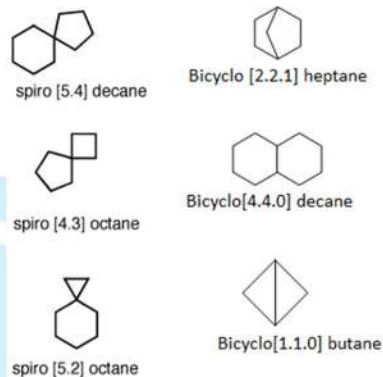
Nomenclature of Compounds with More than One Functional Group

If an organic compound has two or more different functional groups, then the parent chain must have maximum number of substituents. The carbon atoms of parent chain are numbered so that lowest number is assigned to the functional group of higher priority. This functional group is represented with a secondary suffix and other functional groups are the substituents

Q2. Explain about nomenclature of the bicyclic and aromatic compound.

Ans.

Nomenclature of Bicyclic Compounds



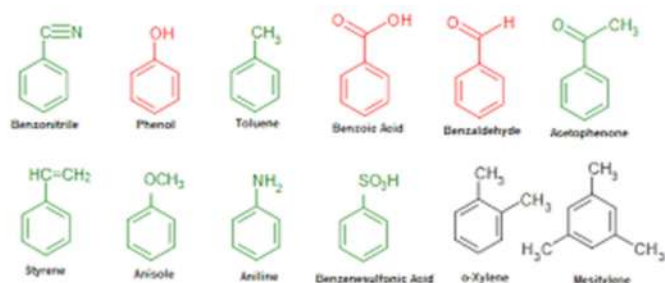
→ Bicyclic compounds have two fused rings joined by two tertiary carbon atoms. While naming these compounds, the alkane name (containing the same number of carbon as the bicyclic compound) is added after the prefix bicyclo-. The number of carbons in each of the three bridges is given within the brackets in descending order. For example,

Nomenclature of Aromatic Compounds

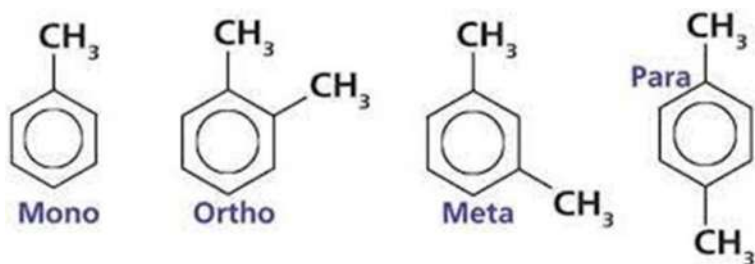
Aromatic compounds have a benzene ring and a Side chain or substituent (the group attached to benzene ring).

Following substitutions are possible on benzene ring

Monosubstituted Benzene: In this benzene ring, a substituent replaces one of the hydrogen atoms. Monosubstituted benzene ring has no isomer as the nuclear carbons are all similar. For example



Disubstituted Benzene: In this benzene ring, two hydrogen atoms of the ring are substituted. For example,



Q3. Write a note on trivial or common system.

Ans.

Trivial or Common System

→ The trivial or common system of nomenclature of the organic compounds is based on various factors like the source, name of discoverer, structure etc:

On the basis of property : some example of organic compounds which were named on the basis of their properties are:

- i) Glucose (sweet in test),
- ii) Glycol (sweet poisonous),
- iii) Glycerol (sweet)

On the Basis of Discovery: Some examples of organic compounds which were named on the basis of their discoverer are:

- RMgX (Grignard reagent),
RZn (Frankland reagent).

Some of the drawbacks associated with trivial system of nomenclature are:

1. This method of naming compounds was not systematic, thus naming large number of compounds was not possible
2. The naming of various organic compounds was not scientific.
3. Often a compound isolated from different sources or by different discoverers or at different places was named in a different way.

For example,

- The name acetic acid originated from the Latin word acetum meaning vinegar.
- The name methyl alcohol name originated from wood spirit (the compound was first isolated by destructive distillation of wood).
- This system of nomenclature thus caused confusion while naming compounds.