PHARMACEUTICAL ORGANIC CHEMISTRY-II- BP301T

UNIT: 5 Cycloalkanes

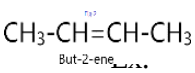
CLASS:1

TOPIC: Cycloalkanes

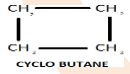
Cyclo-alkanes are also called cycloparaffins.

- They are Alicyclic Compounds i.e. they are both aliphatic and cyclic compounds, and their properties are almost similar to alkanes.
- Cyclo-alkanes are saturated hydrocarbons, that means all the carbons present do not contain any pi bond, all their valency are satisfied with sigma bonds.
- Cyclo-alkanes have General Formula C_nH_{2n} with 1st member Cyclo-propane (Formula: C_3H_6).

Isomerism: - Cycloalkanes have same molecular formula to that of corresponding Alkenes. So they are functional isomers with alkenes of same carbon number.



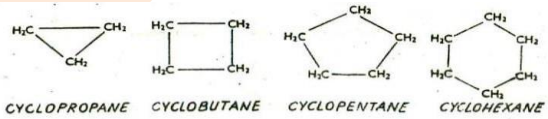
CH3-CH2-CH=CH2
But-1-ene



All the above three structures have molecular formula C_4H_8, But 1st two figures are functional isomer with the third figure.

Nomenclature: It can be read in 3 sections

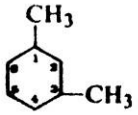
1. Naming of simple cycloalkanes: - It is done by attaching the prefix *cyclo* to the name of the corresponding normal alkane having the same number of carbo atoms as in the ring. For example



2. Naming of substituted cycloalkanes: - Naming of substituents in cycloalkanes as shown in 1st figure below are similar to that of straight chain compounds. But in 2nd compound which is a fused cycloalkane its typical.

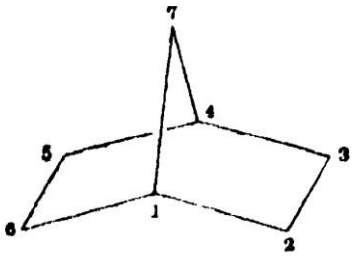
3-Ethylcyclopentene

1,3-Cyclopentadiene



1,3-Dimethylcyclohexane

1,3-Cyclohexadiene



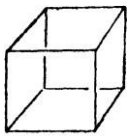
Bicyclo[2.2.1]heptane

Norbornane

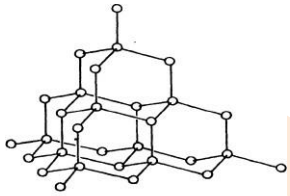
Lets brake the name Bicyclo[2.2.1]heptane. Bicyclo implies the compound has two rings i.e. if we break two carbon bonds, the compound will be an alkane of 7 carbon and can be a heptane. Now the most important part naming of '2.2.1'. It is so named because the number of carbons except bridgeheads and shared carbons is two (C-2 and C-3), two (C-5 and C-6), and the bridge head made of one carbon i.e. C-7.

3. Example of typical cycloalkanes.: Some typical fused cyclo-alkanes are given below.

In cubane each carbon attached to three other carbon, in diamond each carbon attached to 4 other carbons.



Cubane



Diamond