

UNIT – 5

1. Cycloalkanes:

- **Definition:** Cycloalkanes are saturated hydrocarbons with carbon atoms arranged in a closed ring.
- **General Formula:** C_nH_{2n} for cycloalkanes.

2. Stabilities:

- **Baeyer's Strain Theory:**
 - Proposed by Adolf von Baeyer.
 - Cycloalkanes possess angle strain and torsional strain, leading to their instability.
 - Higher strain in smaller rings (e.g., cyclopropane is more strained than cyclohexane).
- **Limitation of Baeyer's Strain Theory:**
 - Fails to explain the relative stability of cycloalkanes accurately.
- **Coulson and Moffitt's Modification:**
 - Introduced the concept of Puckered structures.
 - Explains the strain in cyclohexane more accurately.
- **Sachse Mohr's Theory (Theory of Strainless Rings):**
 - Proposes that cyclohexane is not flat but adopts a "chair" conformation, minimizing strain.
 - Considered more accurate in explaining the stability of cycloalkanes.

3. Reactions of Cyclopropane and Cyclobutane:

- **Cyclopropane:**
 - **Ring Strain:** High due to small bond angles (60 degrees).
 - **Reactions:**
 - Susceptible to ring-opening reactions due to high strain.
 - Undergoes reactions such as addition reactions and substitution reactions.
- **Cyclobutane:**
 - **Ring Strain:** Moderate.
 - **Reactions:**

- Undergoes reactions like ring-opening reactions and substitution reactions.
- More stable than cyclopropane due to larger bond angles.

PHARMACY PEERS