Organic Chemistry Notes

1. Introduction to Organic Chemistry

Organic chemistry is the study of carbon-containing compounds and their properties. These compounds can range from simple molecules like methane (CH4) to complex macromolecules like proteins and DNA. Organic chemistry plays a crucial role in fields like medicine, biochemistry, and materials science.

2. Bonding in Organic Molecules

- Covalent Bonding: Organic compounds are mainly held together by covalent bonds, where atoms share electrons to achieve stability. This type of bonding is essential in molecules like hydrocarbons.

- Hybridization: In organic molecules, carbon can undergo different hybridizations (sp, sp2, sp3), which affect the shape and bonding properties of the molecule. For example, sp3 hybridization in methane leads to a tetrahedral structure.

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- Resonance: Some molecules exhibit resonance, where the true structure is a hybrid of multiple forms. This helps stabilize molecules such as benzene.

3. Functional Groups

Functional groups are specific groups of atoms within molecules that are responsible for the characteristic chemical reactions of those molecules. Some common functional groups include:

- Alkanes (single bonds, e.g., methane)
- Alkenes (double bonds, e.g., ethene)
- Alcohols (-OH group, e.g., ethanol)
- Aldehydes (-CHO group, e.g., formaldehyde)