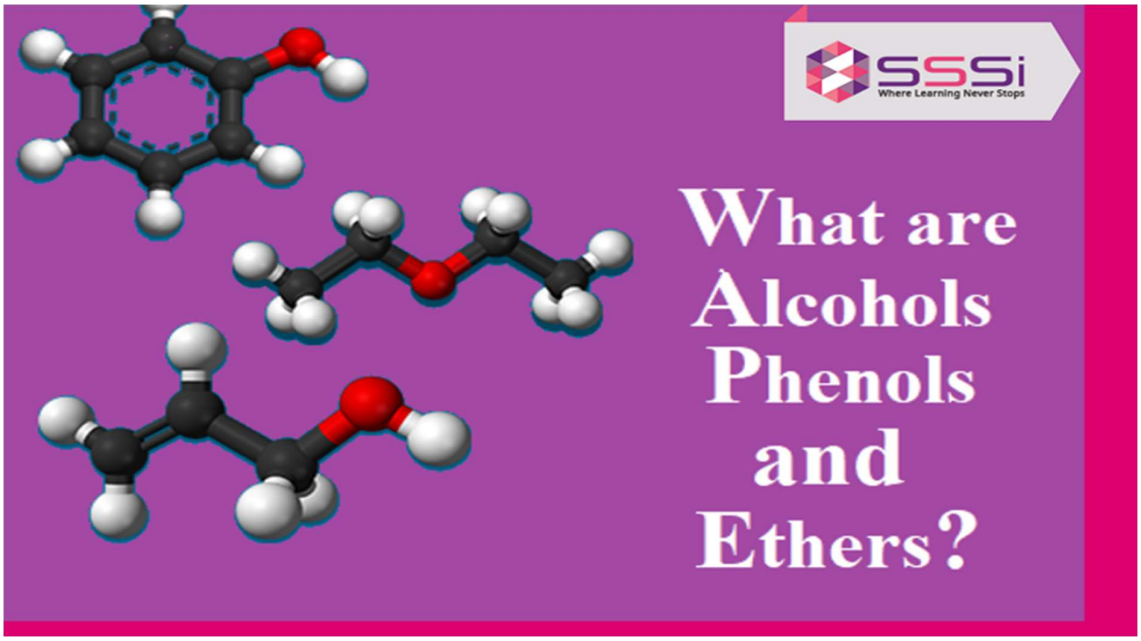
Important Notes on Alcohols Phenols and Ethers

If you are sincerely preparing for the NEET examination, then the chapter **Alcohols Phenols and Ethers** are the most important as it carries heavy weightage in the questions papers. Whenever you study, you must make comprehensive notes of each topic to help you in your last-minute revision. Check below the **Alcohols Phenols and Ethers NEET notes**, which cover the entire topic of the chapter.



What are Alcohols Phenols and Ethers

These three types of organic compounds that are widely used in a variety of businesses and personal use. But what exactly are they?

- When a saturated carbon atom links to a **hydroxyl (-OH) group**, the result is **Alcohol**.
- When the -OH group replaces the hydrogen atom in benzene, we obtain **Phenol**.
- When an oxygen atom links to two alkyl or aryl groups, **Ether**.

This blog post mainly focuses on the chapter; therefore, it is not required to read the whole chapter from the textbook. The following are the subtopics covered in **Alcohols Phenols and Ethers for NEET notes**:

- Classification of Alcohols Phenols and Ethers
- Nomenclature
- Preparation of Alcohols
- Preparation of Phenols
- Preparation of Ethers

Classification of Alcohols Phenols and Ethers

The following are the classification of each category:

Alcohol:

Monohydric, **dihydric**, **trihydric**, and **polyhydric alcohols** are classified according to whether they contain one, two, three, or more than three hydroxyl groups, respectively.

Monohydric alcohols are further divided into the following categories:

- Hydroxyl group is connected to an alkyl group with **sp3 hybridised carbon atoms** in compounds with a Csp3-OH bond. Primary, secondary, and tertiary alcohols are the three types of Alcohol.
    - Primary: carbon directly attached to -OH group
    - Secondary: two carbon attached to -OH group
    - Tertiary: three carbon atoms are attached to the -OH group.
- The hydroxyl group is connected to sp3 hybridised carbon atom close to the carbon-carbon double bond in **allylic alcohols**.
- Hydroxyl group connected to sp3 hybridised carbon atom close to aromatic ring in **benzylic alcohols.**

Phenol:

Based on the number of hydroxyl groups, it can be classified into:

- **Monohydric Phenol:** it consists of one -OH group
- **Dihydric Phenol** consists of two OH groups; it can be ortho-, meta- or para- derivative.
- **Trihydric Phenol:** it consists of three -OH groups

Ether:

Based on the type of alkyl or aryl groups close to the oxygen atom at Ether, it can be classified into the following types:

- **Symmetrical Ether:** it is considered the same Ether as the alkyl or aryl group is connected to either side of oxygen. For example, **CH3OCH3**, **C2H5OC2H5** etc.

- **Unsymmetrical Ether:** it is also called mixed Ether as it consists of different groups of alkyl or aryl connected to either side of oxygen. For example, CH3OC2H5, C2H5OC6H5, etc.

Nomenclature of Alcohols Phenols and Ethers

The following are the nomenclature of Alcohols Phenols and Ethers:

Nomenclature of Alcohols:

- Common name: 'Alcohol' is a term related to the name of an alkyl group, such as methyl alcohol, ethyl alcohol, and so on.

- IUPAC: The suffix-'ol' is appended to the alkane name, such as **methanol (CH3OH)**.

Nomenclature of Phenol:

Phenol is the most basic benzene derivative. It is the approved IUPAC name. We refer to substituted phenols as phenol derivatives in both the common and **IUPAC systems.**

C6H5OH is the simplest **Phebgbhggnol**
The location of the OH group is denoted by o (**ortho**), m (**meta**), p (**para**) or cyclic carbon numbers etc.

Nomenclature of Ether:

- Common name: the word ether follows the alphabetical sequence of the name of the alkyl group, e.g. Ethyl Methyl ether, Ether of diethyl etc.

- IUPAC name: derivative of **alkoxy** or **aryloxy** hydrocarbons. The parent hydrocarbon, such as **methoxymethane, methoxybenzene**, and so on, is referred to as the bulkier group.

Preparation of Alcohols

There are several methods of preparation of Alcohol in industries and laboratories. The following are a few among them:

- **Hydrolysis of Alkyl Halides:** A **nucleophilic** substitution reaction is one in which the nucleophile replaces the nucleophile. The procedure isn't effective. This is due to the presence of olefins as by-products ions.

$$\mathbf{R\text{-}X + KOHaq \rightarrow R\text{-}OH}$$

- **Carbonyl compound:** The addition of hydrogen to aldehydes and ketones in catalysts such as nickel, platinum, and palladium reduces aldehydes and ketones. Primary alcohols are formed from aldehyde, whereas secondary alcohols are formed from ketones.

- **Reduction of carboxylic acids and esters:** Lithium hydrogen hydride carboxylic acids are reduced to primary alcohols in the presence of powerful reducing agents.

- **Grignard reagent:** Alcohol is produced by adding RMgX (Grignard reagent) to aldehyde and ketone.

For detailed notes on the preparation of Alcohol, take enroll in our **chemistry online tuition** to learn the concepts from scratch.

Preparation of Phenols

The following are the way through which the phenols are prepared:

- **Haloarenes:** Sodium phenoxide is formed when NaOH is reacted with chlorobenzene, which is again treated with acid to form phenols.

  $C_6H_5Cl + NaOH \rightarrow C_6H_5ONa + HCl \rightarrow C_6H_5OH$

- **Benzene sulphonic acid:** Sulphonation of benzene with oleum is the initial step in producing sulphonic benzene acid. With molten NaOH, sulphonic benzene acid is heated to create sodium phenoxide, subsequently acidified from Phenol.
- Aniline ($C_6H_5NH_2$) is a diazonium salt that combines with $NaNO_2$ + HCl to generate Benzene diazonium chloride (**$C_6H_5N_2Cl$**) hydrolyses to yield Phenol.

- **Cumene (isopropylbenzene)** is oxidised and converted to Phenol using dilute acid. Acetone is a by-product of the reaction.

Preparation of Ethers

- **Dehydration of alcohols:** When primary alcohols are treated with protic acids, the nucleophilic bimolecular process yields Ether (H_2SO_4, H_3PO_4). The principal products of this reaction are alkene at 443 K and Ether at 413 K, depending on the circumstances. When Alcohol is 2° or 3°, the elimination process competes with SN1, resulting in alkene as the primary product.

- **Williamson synthesis:** When sodium alkoxide reacts with an alkyl halide, Ether is produced. When using a 1° alkyl halide, SN2 is favoured, and Ether is generated as the main product; however, when using a 2° or 3° alkyl halide, elimination proceeds and alkene is created as the primary product. This process may also be used to convert Phenol to Ether.

Download Alcohols Phenols and Ethers notes PDF.

Contact Details

SSSi Online Tutoring Services
Email: Contact@sssi.in
Mob: 7428739407
Official Website: www.sssi.in
Address: G-24, 1st Floor, Sector 6, Noida UP, 201301

SSSi
Where Learning Never Stops