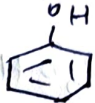


ALCOHOLS

Introduction: All organic compounds, which consists of $-OH$ as a functional group are called alcohols.

Exceptions - If $-OH$ group be attached directly to the aromatic ring, it is not an alcohol but a phenol. eg - C_6H_5OH i.e.  phenol

but If $-OH$ group be attached in the side chain of the aromatic ring, the compound is an aromatic alcohol.

eg - $C_6H_5CH_2OH$ i.e.  is called Benzyl alcohol.

Examples of some alcohols:

a. CH_3OH [Methanol]

b. $ClCH_2 \cdot CH_2OH$ [2-chloro ethanol]

c. $CH_2=CH-CH_2OH$ [Allyl alcohol]

d. $\begin{array}{c} CH_2OH \\ | \\ CH_2OH \end{array}$

Glycol

e. $\begin{array}{c} CH_2OH \\ | \\ CHOH \\ | \\ CH_2OH \end{array}$

Glycerol

f. $\begin{array}{c} OH \\ | \\ CH_3-CH-CH_3 \end{array}$

2-hydroxyl propanol

OR
sec. propyl alcohol.

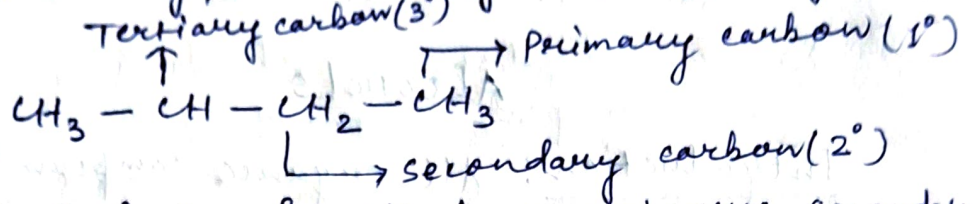
Classification of Alcohols:

Alcohols are classified on the basis of

- ① Nature of carbon atom to which $-OH$ group is attached.
- ② Number of $-OH$ groups present in the alcohol.
- ③ Saturation.

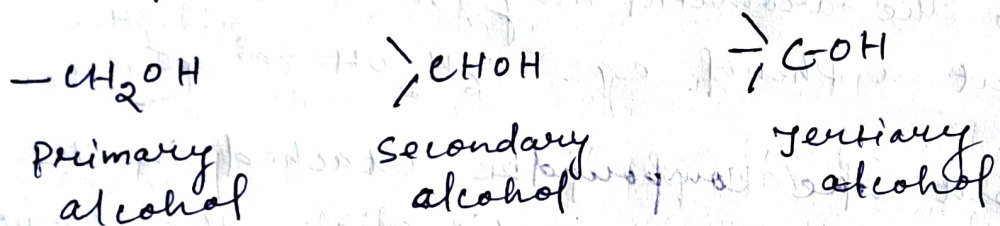
Nature of carbon atom - carbon atom may be primary, secondary or tertiary

i.e. $\text{Tertiary carbon (3}^\circ\text{)} \xrightarrow{\quad} \text{Primary carbon (1}^\circ\text{)}$

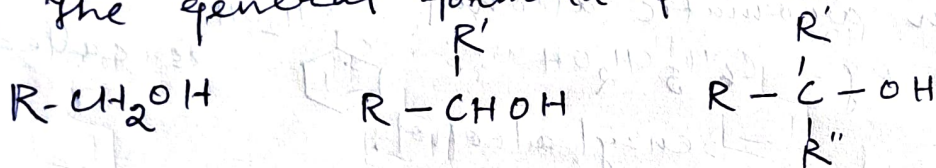


An alcohol is classified as primary, secondary and tertiary as $-OH$ group is attached to a 1° , 2° or 3° carbon atom.

→ the functional groups of these alcohols are —



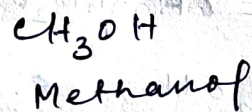
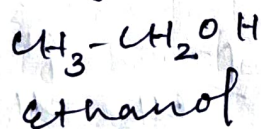
→ The general formula of these R' alcohols are -



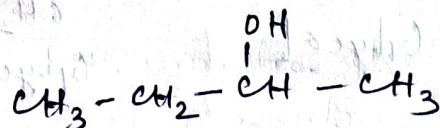
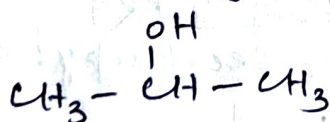
R, R', R'' are alkyl groups, these groups may be similar or dissimilar.

→ Examples:

Primary alcohols



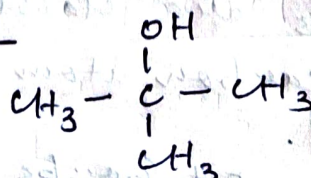
Secondary alcohol



2-hydroxy propanol

2-hydroxy butanol

Tertiary alcohol



2-hydroxy-2-methyl propanol

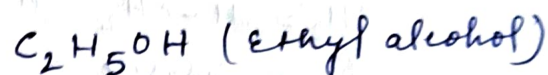
②

② No. of hydroxyl groups present in the alcohol :-

Alcohols are further classified as monohydric, dihydric, trihydric and polyhydric as alcohol consists of one, two, three and more than three $-OH$ groups.

Example :

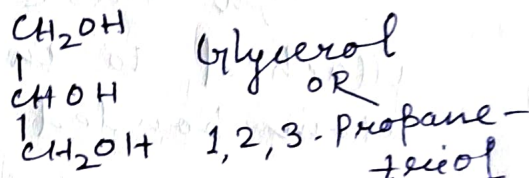
Monohydric alcohol



Dihydric alcohol



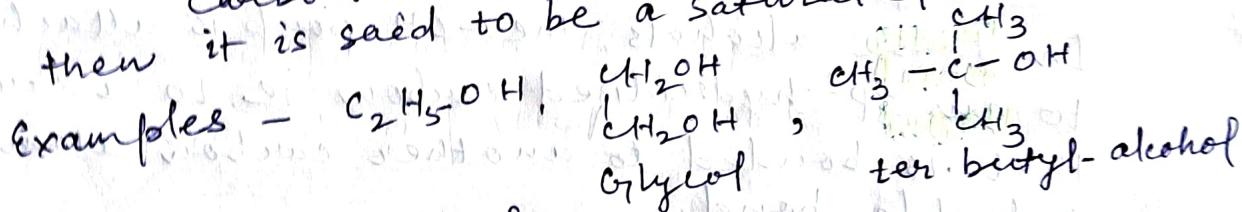
Trihydric alcohol



③ On the basis of saturation :-

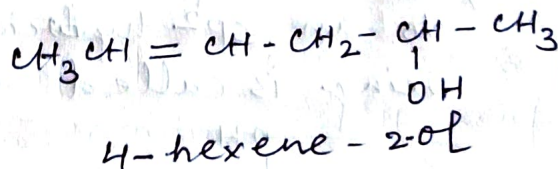
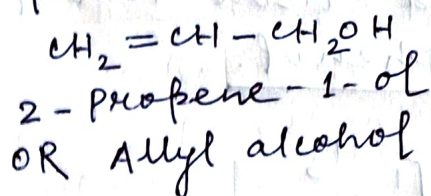
Alcohols are also classified as saturated and unsaturated alcohols.

Saturated alcohol : If all the carbon-carbon bonds of the alcohol be σ -bonds, then it is said to be a saturated alcohol.



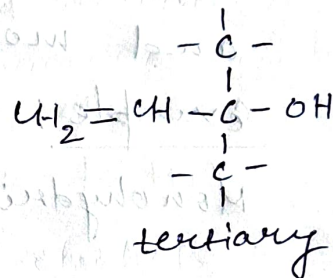
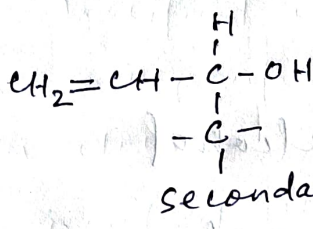
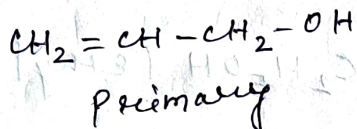
Unsaturated alcohol : If at least two carbon atoms of the alcohol be attached through a π -bond, the alcohol is said to be an unsaturated alcohol. / Allylic alcohols.

Examples -



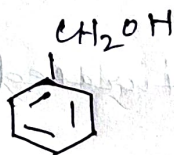
* Allylic Alcohols: In allylic alcohols, the $-OH$ gr. is attached to a sp^3 hybridized carbon next to the carbon-carbon double bond, that is to an allylic carbon.

For example

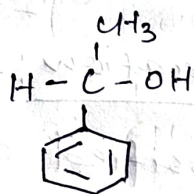


* Benzylic alcohols:

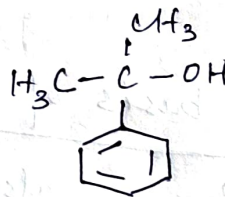
In these alcohols, the $-OH$ group is attached to an sp^3 hybridized carbon atom bonded to an aromatic ring.



primary



secondary

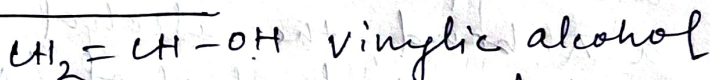


tertiary

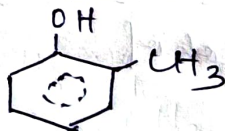
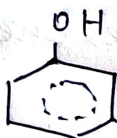
* Monohydric Alcohols containing $C sp^2-OH$ Bond.

In these alcohols, the $-OH$ group is attached to an sp^2 -hybridized carbon, i.e. to a carbon that is bonded to another carbon atom by a double bond.

→ such a carbon atom is called vinyl carbon, and the alcohols in which $-OH$ group is attached called vinyl alcohols.



→ the compound in which $-OH$ group is attached to an sp^2 hybridized carbon atom of an aryl ring is called a phenol.



phenols