1.

# IMPORTANT QUESTIONS

## (From Previous Year)

# For Degree-I (Hons.)

By-Dr.Rinky ,Dept.of Chemistry,12-08-2020

## Explain the following :-

## a. Acetylene is a Linear molecule.

**Ans.** Acetylene ($C_2H_2$)

Structure : $H-C\equiv C-H$

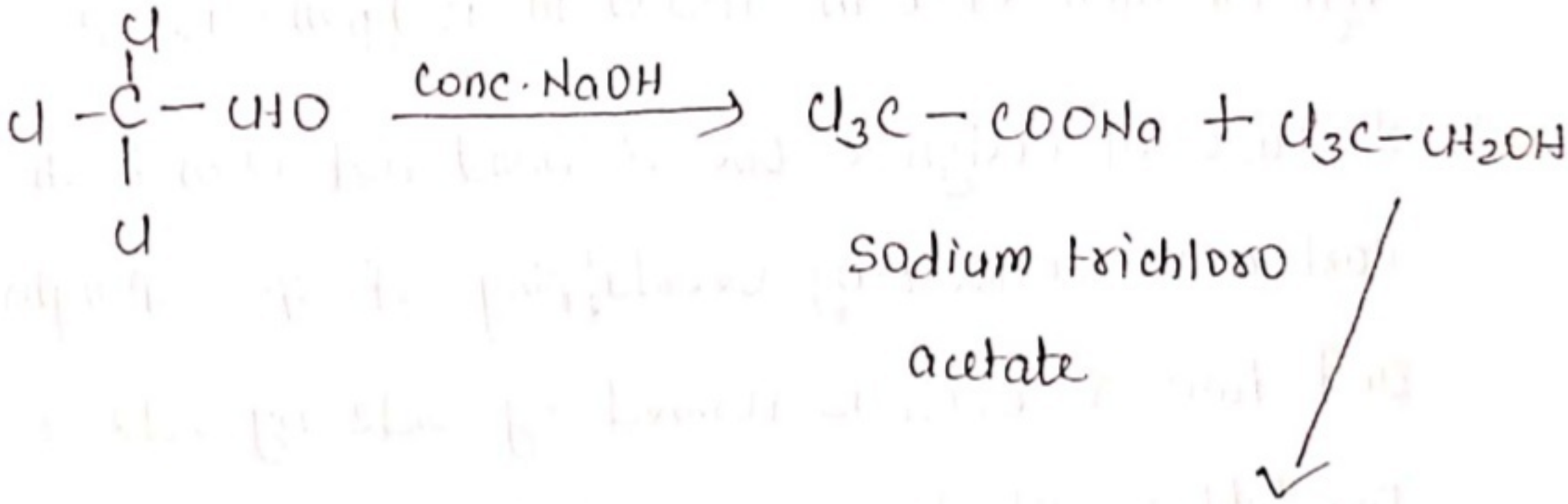
Hybridisation of both carbon in acetylene is sp.

In case of acetylene one $\sigma$-bond between both carbon is formed by overlapping of sp - sp hybridisation and two $\pi$-bond is formed by side by side (colateral) overlapping of two unhybrid p-orbital of both carbon. Since, H-C-C bond angle in sp-hybrid orbital is 180° hence, it is a linear molecule.

## b. Trichloroacetaldehyde undergoes Cannizzaro Reaction. 2.

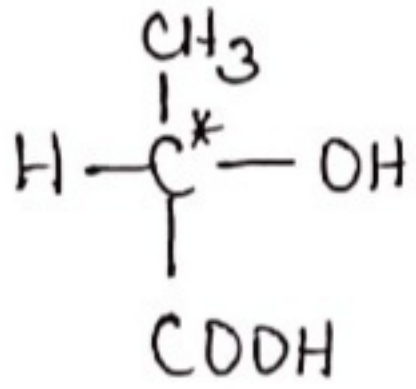
**Ans.** Cannizzaro reaction is given by those aldehyde which don't have any $\alpha$-hydrogen.

$H_3C-CHO$ also don't have any $\alpha$-hydrogen, hence show cannizzaro reaction. When trichloro acetaldehyde is subjected to cannizzaro reaction by using conc. NaOH then salt of trichloro acetic acid and 2,2,2-trichloro ethanol will formed.



# c. Lactic acid exhibits optical Isomerism.

**Ans.**



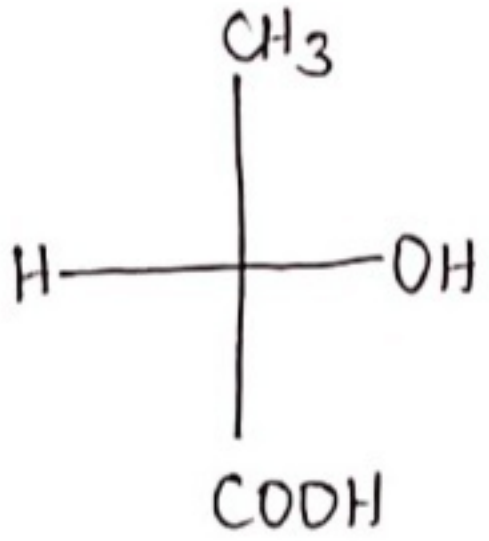

Lactic Acid

* Lactic acid has one chiral Carbon which is star marked in structure.

* We know that the tetrahedral molecule having at least one chiral carbon is known as optically active molecule.

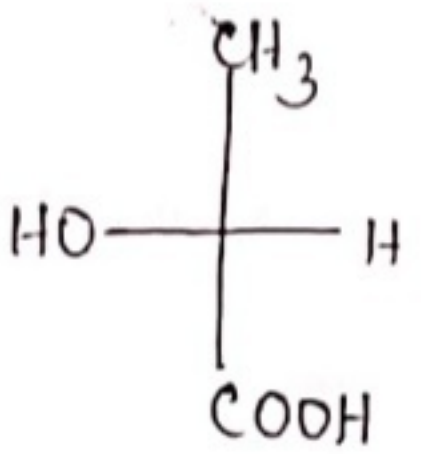
Thus, Lactic acid exhibits optical isomerism due to presence of one chiral carbon.

* The no. of optical isomer of Lactic acid $= 2^1 = 2$
* Out of these two isomers one is dextro rotatory and other is laevo rotatory.




(dextro)

+ Lactic acid




Laevo

(—) Lactic acid

## d. Acetylene undergoes both addition and substitution reaction.

**Ans.** In acetylene both hydrogen is terminal and since terminal hydrogen is directly attached with sp hybridised carbon, it is acidic in nature and easily remove as $H^+$ leaving behind acetylide carbanion.

* The acetylide carbanion is a good 'C' nucleophile and can undergo substitution reactions, 1° or 2° alkyl halide to produce longer alkyne chain.

$$H-C\equiv C-H \xrightarrow{NaNH_2} H-C\equiv \bar{C}\,Na + NH_3$$

$$HC\equiv \bar{C}\,\overset{+}{N}a + R-Cl \longrightarrow \boxed{HC\equiv C-R} + NaCl$$

* The unsaturated compound can show addition reaction. Acetylene has two $\pi$-bond so, it can show addition addition reaction to get converted into saturated compound.

For example

$$H-C\equiv C-H + H_2 \xrightarrow{\text{Raney Ni}} H-\underset{H}{\overset{H}{C}}=\underset{H}{\overset{H}{C}}-H \xrightarrow{H_2/Ni} H-\underset{H}{\overset{H}{C}}-\underset{H}{\overset{H}{C}}-H$$

$$H-C\equiv C-H + Br_2 \xrightarrow{CCl_4} \underset{Br}{\overset{H}{}}C=C\overset{Br}{\underset{H}{}} \xrightarrow{Br_2/CCl_4} \underset{Br}{\overset{H}{}}C-\underset{Br}{\overset{H}{C}}-Br$$

**Completed..**