1.

IMPORTANT QUESTIONS

(From Previous Year)

For Degree-I (Hons.)

09/11/2020

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 σ-bond between both carbon is formed by overlapping of sp - sp hybridisation and two π-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.

Revision Notes

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b. Acetylene undergoes both addition and substitution reaction. 2.

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.

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

$$HC\equiv \bar{C}\,Na^+ + R-Cl \longrightarrow \boxed{HC\equiv C-R} + NaCl$$

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

For example

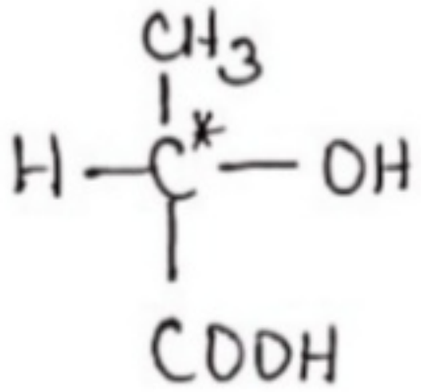
$$H-C\equiv C-H + H_2 \xrightarrow{Raney\ Ni} H-\underset{H}{\overset{H}{C}}=\underset{H}{\overset{H}{C}}-H \xrightarrow{H_2/Ni} H-\underset{H}{\overset{H}{C}}-\underset{H}{\overset{H}{C}}-H$$

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

Completed..

c. Lactic acid exhibits optical Isomerism.

Ans.



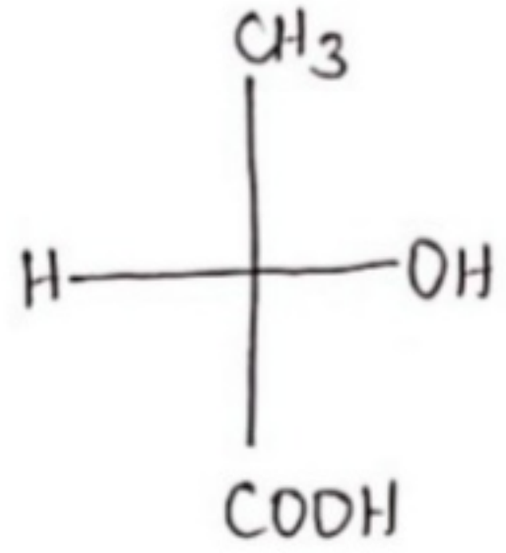
Lactic Acid

* 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.

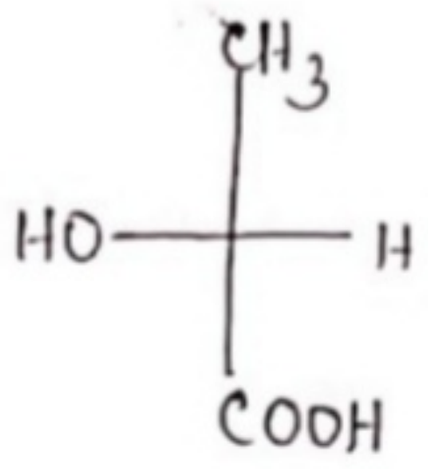
Thus, Lactic acid exhibits optical isomerism due to presence of one chiral carbon.

* 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

Completed