SECTION (B)

Q NO: 02

(i)

IONIZATION ENERGY.

The energy required to remove the electron from the valence shell of an atom to form an ion of gaseous state is called Ionization energy.

Ionization energy of phosphorus is higher than Sulphur.

REASON:-

It is because of the reason that Sulphur have such an electronic configuration that it favours high ionization energy for the sake of stability.

S = $1s^2, 2s^2, 2p^6, 3s^2, 3p^4$

In general trend if we move from left to right then I.E increases but we see peculiar behaviour of Sulphur that is

because Sulphur has "$3p^4$" configuration it loses one electron readily to form "$3p^3$" configuration which is stable form.

So, we can say that Phosphorus has higher value of I.E.

(iii)

WOHLER WORK:-

Wohler was the first scientist to prepare an organic compound used in a laboratory. For which he follow the following reactions.

$N_2 + 3H_2 \longrightarrow 2NH_3$

He reacts ammonia with CO_2 to form ammonium carbamate.

$2NH_3 + CO_2 \rightarrow NH_2CONH_4$

He then heated ammonium carbamate to change it into urea.

$$NH_2CONH_4 \xrightarrow{\Delta H} NH_2-\overset{O}{\overset{\|}{C}}-NH_2 + H_2$$

IMPORTANCE:-

The wohlex work was of prime importance because earlier it was believed that organic compounds can only be synthesized by the

remains of living matter. But he opened the way for the synthesis of many organic compounds by preparing urea in laboratory.

(xiii)

APPLICATIONS OF IR SPECTROSCOPY:-

Following are the main applications of IR spectrometry

1) It can be used to detect and find the functional group of organic compounds.
2) It can be used to detect impurities in a sample of compound.
3) By the aid UV-V and NMR spectrometry it can be used to find concentration of different compounds.
4) It can be used to identify different compound within fingerprint range.
5) It can be used to find the progress of a reaction.

(xi)

USES OF PVC:-

Following are the four uses of PVC.

1) It can be used to make plastic sexins.
2) It can be used as an insulating material in wires.
3) It can be used in formation of medical tubes.
4) It can be used in leather materials and pipes etc.
5) It can be used in bottles.

(X)

EFFECT OF pH ON ENZYME.-

pH has great effect on the activity of enzyme. Each enzyme works in specific pH range which is called it's optimum pH. Any alteration from this optimum range can cause the inability of enzyme to attach with substrate and unable to peoform

it's action.

Example:- for example pepsin works around 2pH while trypsin works at 7-8 pH.

EFFECT OF TEMPERATURE ON ENZYME.-

Enzymes are also greatly affected by the increase or decrease in temperature. Each enzyme works

in it's optimum temperat. use. The increase in temperature can cause increase in enzyms activity but upto a specific range. Further increase in temperature can denature the protein nature of enzyme and it's activity stops. At lower temperature i.e 0°C enzyms freezes and it's activity is reduced.

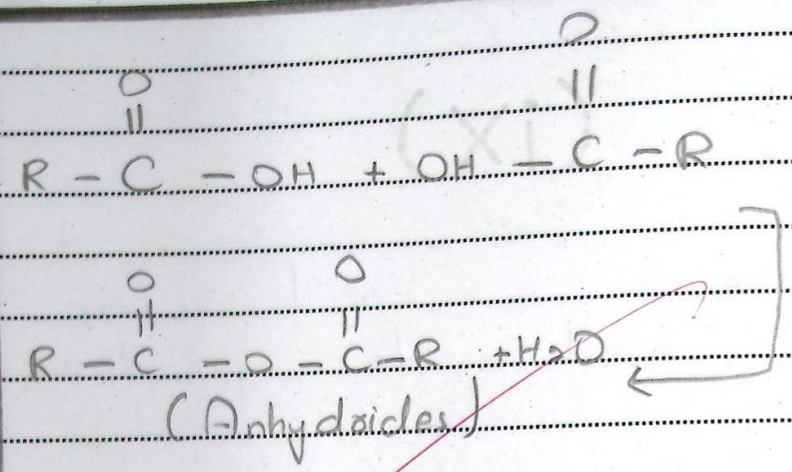
Example:- All the enzymes of human body works best at 37°C.

(ix)

Carboxylic acid can be used to produce acid amides and acid anhydrides.

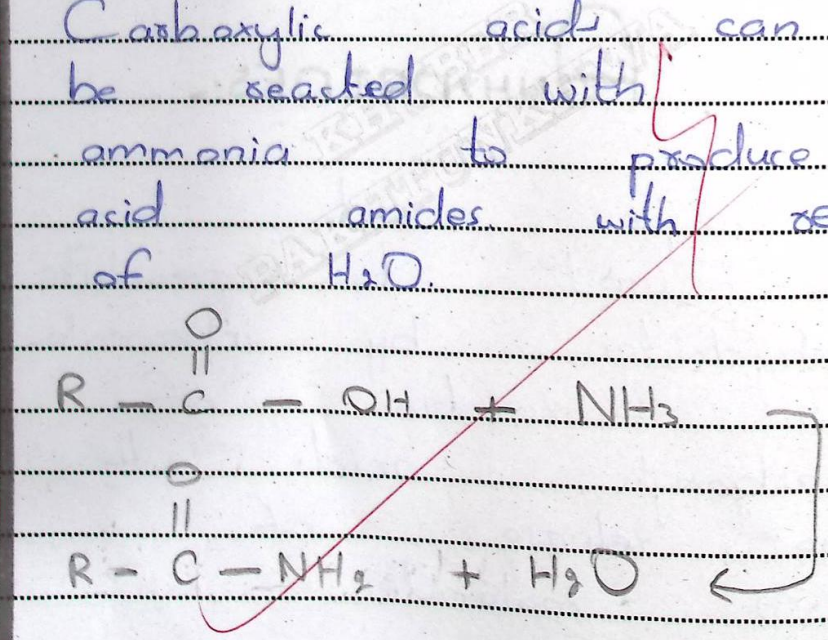
CONVERSION INTO ANHYDRIDES:-

Carboxylic acid can be used to produce anhydrides by intermolecular reaction of carboxylic acids with the release of H_2O molecule.



Into Acid Amides:-

Carboxylic acid can be reacted with ammonia to produce acid amides with release of H_2O.



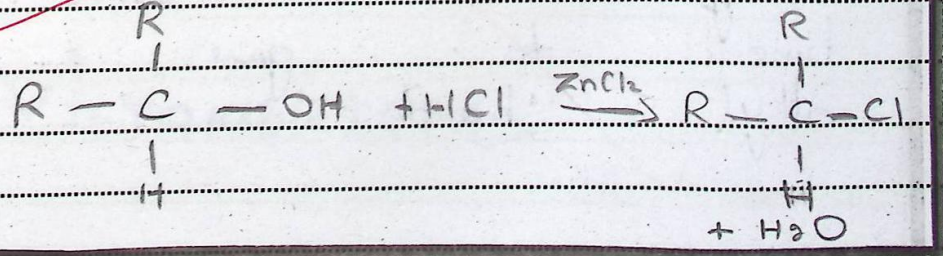
(Vii)

Lucas Reagents:-

Lucas reagents can be used to find whether the alcohol is primary, secondary or tertiary.

It is composed of anhydrous $ZnCl_2$ and dilute HCl.

The general reaction is given by:-



This general reaction can be used to detect whether the alcohol is primary, secondary and tertiary.

TERTIARY ALCOHOL:-

It reacts readily with Lucas reagents to give an alkyl halide which gives cloudiness appearance.

SECONDARY ALCOHOLS:-

It reacts with lucas reagents after some time to give alkyl halide.

PRIMARY ALCOHOL:-

They don't reacts with Lucas reagents at room temperature.

CONCLUSION:-

Thus time taken by alcohols and appearance of cloudiness of alkyl halide can be used to detect different alcohols.

(iv)

METAMERISM:-

It is a

type of isomerism in which there is an uneven distribution of groups at both sides of functional group.

EXAMPLE:-

Example is ethyl-methyl ether.

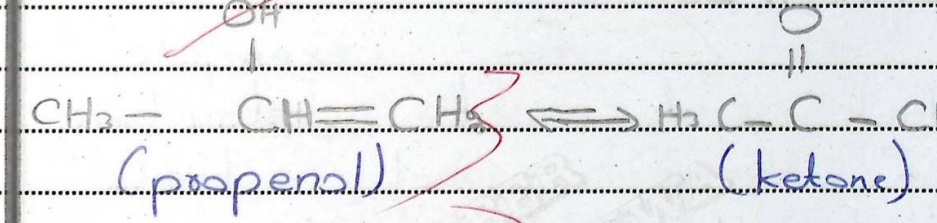
$H_3C - O - C_2H_5$

TAUTOMERISM:-

It is the special type of isomerism in which there is a differs in position of proton and exists in an equilibrium state.

EXAMPLE:-

An example of tautomerism is keto-enol formation.



(V)

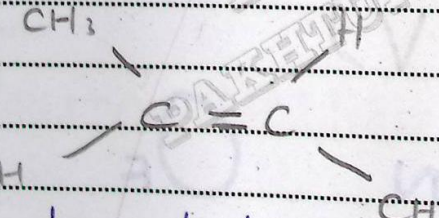
CONDITION OF GEOMETRIC ISOMERISM:-

The condition for the

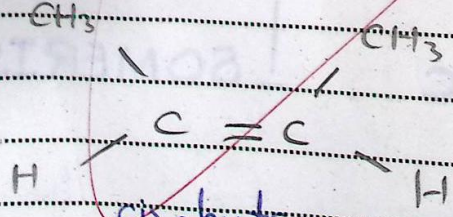
geometris isomerism is that the Carbon which is involved in the formation double bond should have two different groups attach to it.

EXAMPLE:-

For example look at the structure of cis and trans butene.



trans-butene



cis-butene

If we observe these structure then we can conclude that the carbon which is involved in double bond of trans-butene has two different groups i.e CH_3 and Hydrogen. Same in the case of cis-butene has also two different groups i.e CH_3 and Hydrogen so it satisfy the condition of geometris isomerism.

(VIII)

TOLLEN'S REAGENT:-

It is a test used to detect aldehydes in the presence of Tollen's solution i.e ammonium silver nitrate which reacts with aldehydes to form precipitates of grey silver.

$$RCHO + 2Ag(NH_4)_2 + OH^- \rightarrow RCO(NH_4) + 2Ag^{+2} + H_2O \xrightarrow{H^+}$$

FEHLING'S SOLUTION:

It is a solution of copper hydroxide in which aldehydes reacts with it to form precipitation of copper

ions.

$RCHO + Cu(OH)_2$

$RCOO^- + Cu^{+2} + 3H_2O$

IMPORTANCE:-

Fehlings solution and Tollens are of prime importance for the detection of aldehydes as it separates aldehydes from ketone mixture of and Ag^{+2} form Cu^{+2} precipitates.

SECTION (C)

Q NO: 05

GRIGNARD'S REAGENT:-

Grignard reagents are organo-metallic compounds having Magnesium metal attach with R-alkyl group and X-halide group i.e R-MgX.

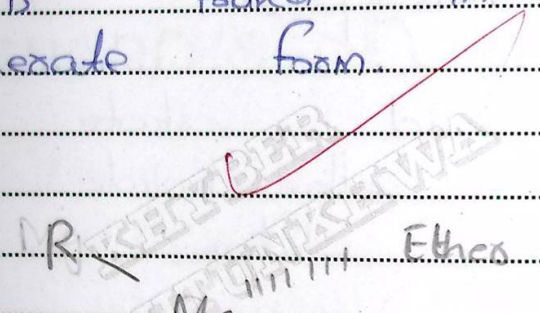
PREPARATION OF

GRIGNARD'S REAGENTS:-

Grignard's reagents can be prepared by reaction of alkyl-halide and Magnesium in the presence of ether solution. It's a heterophase reaction because in which metal in solid state reacts with alkyl-halide in liquid solution of ether.

This reaction rate depends upon the size of alkyl group i.e the larger the size slower will be reaction and vice versa. It also depends upon the nature of halide group i.e higher

the electronegativity slower will be the reaction. Ethers here play an important role as a medium of reaction and can be used to isolate crystalline Grignard reagents. Because it is found in di-etherate form.



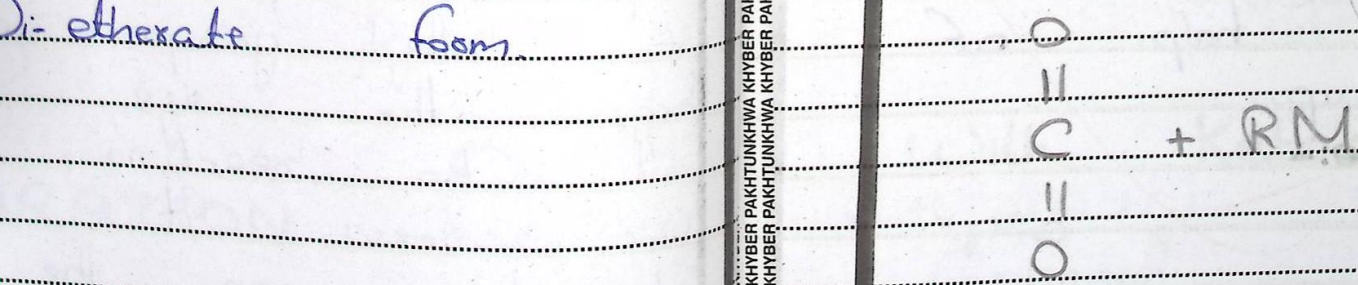
Di-etherate form.

REACTIONS OF

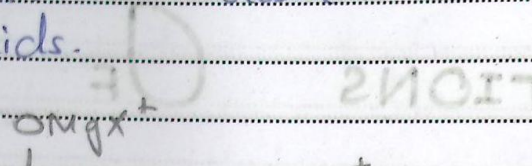
R-MgX :-

i) with CO_2

Grignard reagents reacts with Carbon dioxide to form carboxylic acids.



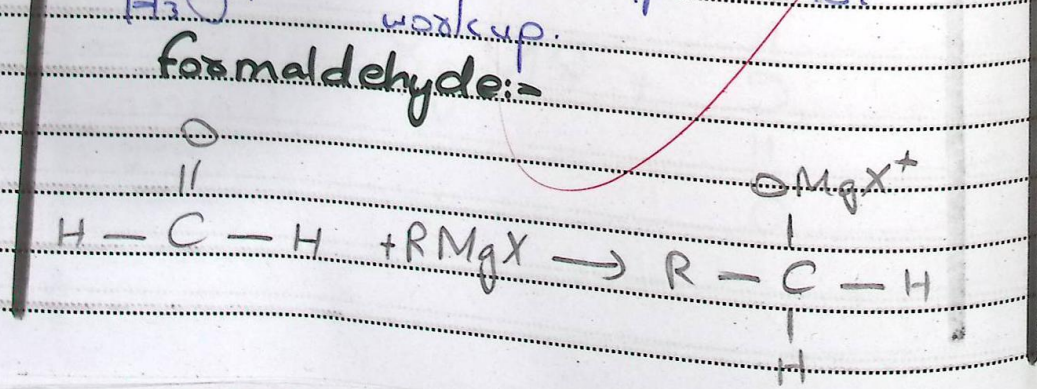
The intermediate stage is treated with H_3O^+ to form stable carboxylic acids.

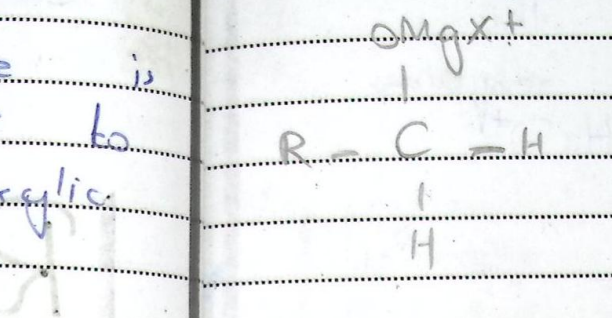


ii) with aldehyde:-

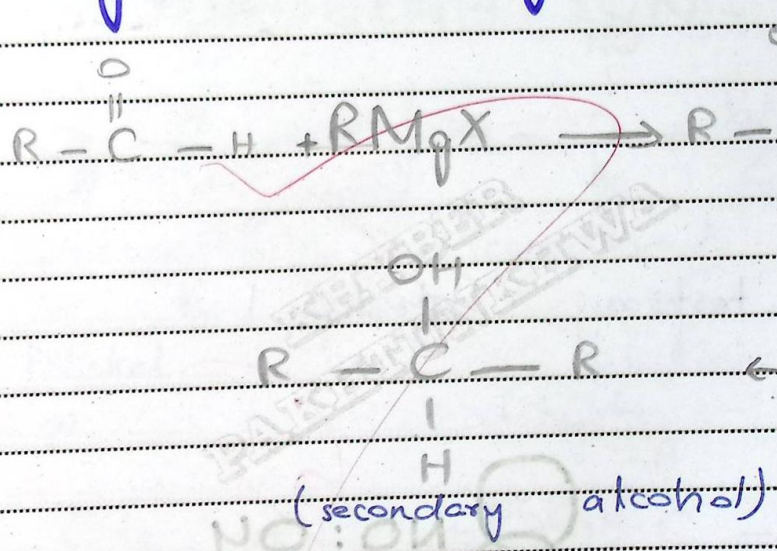
It reacts with formaldehyde and higher aldehydes to form primary and secondary alcohols. These reactions are also done with the help of H_3O^+ workup.

a) formaldehyde:-





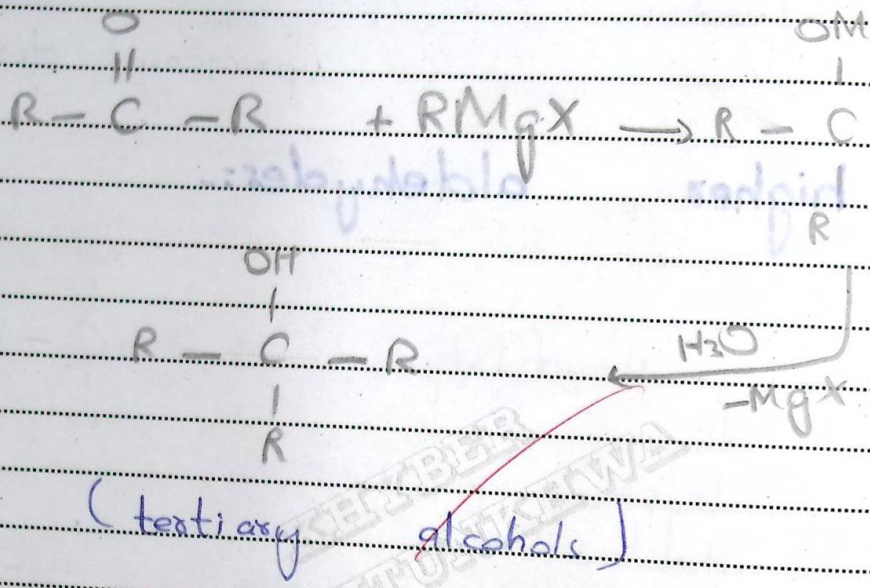
higher aldehydes:-



ii) With Ketones:-

Grignard reagents reacts with ketones to form

tertiary alcohol. This reaction also requires workup of H_3O^+



(tertiary alcohols)

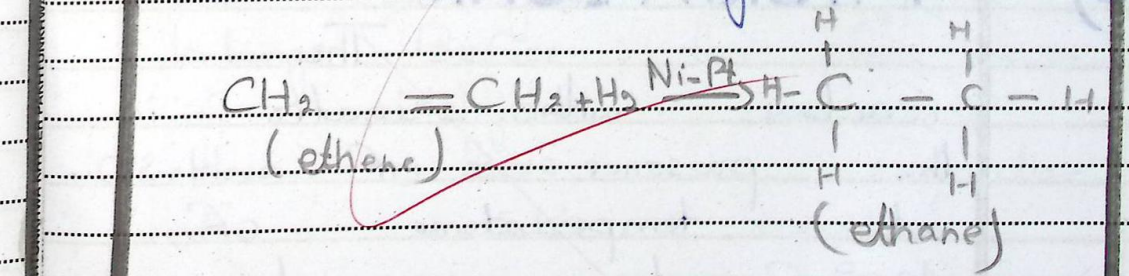
Q NO: 04

IMPORTANT REACTION OF ALKENES:-

Following are the important reactions of alkenes.

1) HYDROGENATION:-

They undergoes addition of hydrogen to form saturated compounds in the presence of Nicked and platinium as catalyst.



2) HALOGENATION:-

They reacts with halogens to produce di-halides.

$CH_2 = CH_2$ (ethene) $+ Br_2 \rightarrow$ $H-\underset{H}{\overset{Br}{C}}-\underset{H}{\overset{Br}{C}}-H$ (1,2 di-bromo ethane)

This reaction is used to detect presence of double bonds.

3) HYDRATION:-

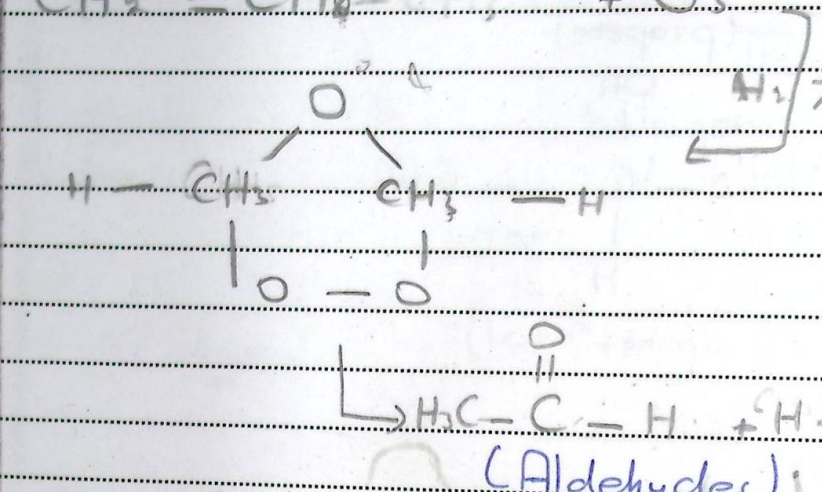
They reacts with water in the presence of H_2SO_4 at temperature of 100° C to produce alcohols.

$CH_2 = CH - CH_3$ (propene) $+ H_2O \xrightarrow[100°C]{H_2SO_4}$ $CH_3-\underset{H}{\overset{OH}{C}}-CH_2$ (propane-2-ol)

WITH OZONE:-

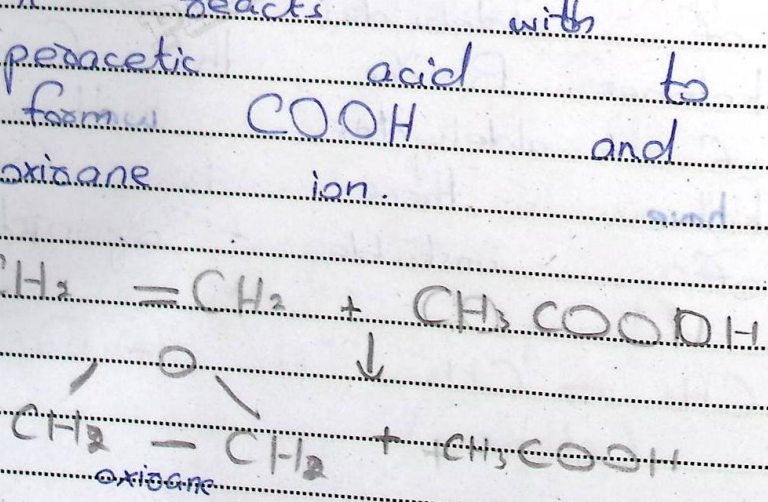
Alkenes reacts with ozone to form mixture of aldehydes and ketones. Before, the formation of aldehydes we have these is formation of unstable ozonide.

$CH_2 = CH_2$ (ethene) $+ O_3$

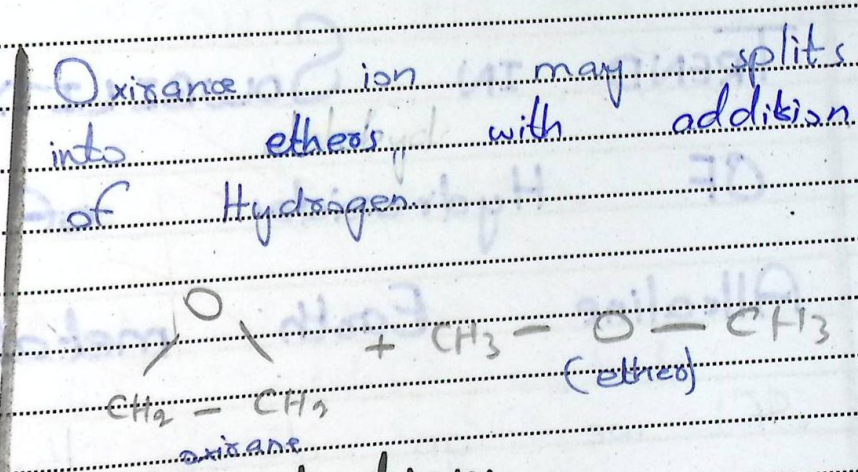


5) EPOXIDATION:-

In epoxidation reaction it reacts with peracetic acid to form CH_3COOH and oxirane ion.

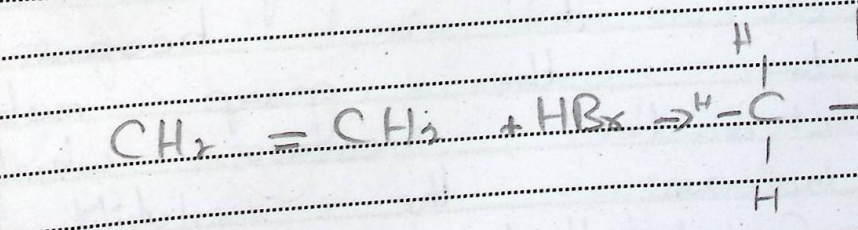


Oxirane ion may splits into ethers, with addition of Hydrogen.



6) Halohydration:-

It may reacts with HBr, HCl etc to form 1-bromoethane or 1-chloroethane



Q NO:03

TREND IN SOLUBILITY OF Hydroxides of Alkaline Earth metals:-

If we go down the group in hydroxides of alkaline earth metal then there is an increase in solubility of hydroxides i.e $Mg(OH)_2$, $Ca(OH_2)$ etc. It is because down the group metallic character increases which increases the solubility of alkaline earth metals and when dissolves

they turn the water into basic.

$$Mg(OH)_2 \xrightarrow{H_2O} Mg^{+2} + (OH)^{-}_{2}$$

$$Ca(OH)_2 \xrightarrow{H_2O} Ca^{+2} + (OH)^{-}_{2}$$

OF SULPHATE:-

The solubility of alkaline earth metals sulphate i.e $MgSO_4$, $SrSO_4$ etc decreases down the group. When we go down the group the metallic character increases but on the other hand charge density decrease and size is increased which tends to form the stable compounds dominating the metallic character and form stong

covalents bonds which decreases the solubility of alkaline earth metal sulphates.

$MgSO_4 \xrightarrow{H_2O} Mg^{+2} + SO_4^{-2}$

$SnSO_4 \xrightarrow{H_2O} Sn^{+2} + SO_4^{-2}$

OF CARBONATES:-

The solubility of alkaline earth metal decreases with when we down the group. It is because of the same reason for alkaline earth metal sulphate that when we go down the group the stability decreases because of lower charge density of alkaline metal decreases and their size increase which form the compound stable it can't be easily. that decomposed

$MgCO_3 \xrightarrow{H_2O} Mg^{+2} + CO_2 + O_2$

$CaCO_3 \xrightarrow{H_2O} Ca^{+2} + CO_2 + O_2$