

"SUBJECTIVE PART"

SECTION-B

QUESTION No. 02 :-

- : Part (i) :-

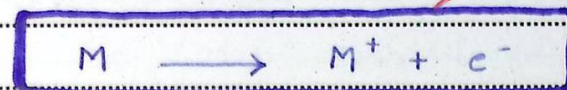
Ionization Energy :-

↳ definition

amount of energy required to convert an atom into

an ion in its gaseous state.

↳ generally



→ The amount of energy required to form the " M^{+} " ion is called ionization energy.

"Phosphorous Vs Sulphur"

↳ Phosphorous

The atomic number of phosphorous is 15. Hence, it follows that Phosphorous has the following electronic configuration.

$1s^2, 2s^2, 2p^6, 3s^2, 3d^3$.

★ Basically the valence orbital of phosphorous is half-filled which makes it more stable. Hence, more energy is consumed in converting phosphorous into an ion.

↳ Sulphur

sulphur is present in the same period as phosphorous that is the 3rd period. It has atomic number of 16.

★ The valence orbital of sulphur is partially filled which makes it a little less stable than phosphorous. Hence, it is easier to ionize.

— : Part (xi) :—

PVC

↳ abbreviation :-

PVC stands for Poly vinyl chloride.

↳ applications :-

PVCs have great use in day-to-day life. Some are listed below.

1) Rexin

PVCs are used to produce leather-like structure called rexin which is used in fabric industry.

2) Electrical Wires :-

PVCs are used to electrically insulate wires.

3) Pipes :-

PVCs are used in the production of water pipes which are durable and long lasting.

4) Flooring :-

PVCs are used as a raw material in flooring.

5) Rubber Gloves :-

PVCs are used in the production of rubber gloves.

- : Part (vii) :-

Identification of Alcohols

Many clinical methods have been developed over the years to detect the kind of alcohols, i.e., primary, secondary or tertiary alcohols.

→ Lucas Test

↳ intro. :-

Lucas test is an experimental method that helps to identify whether a given alcohol is primary, secondary or tertiary.

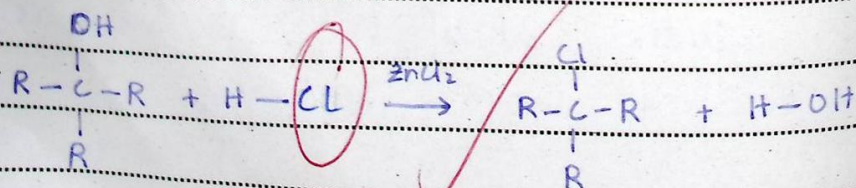
→ working :-

Basically, the given alcohol is reacted with Lucas reagent and is identified on the basis of time taken for the reaction to proceed.

→ Lucas Reagent :-

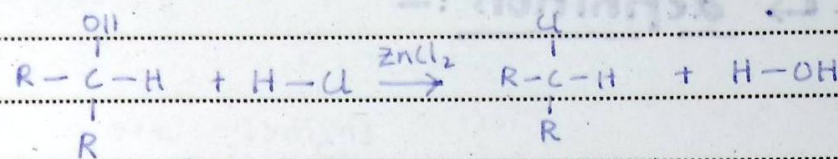
concentrated HCl with ZnCl_2 constitutes Lucas Reagent.

→ Tertiary alcohol :-



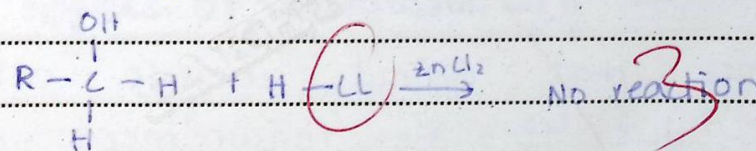
This reaction takes place rapidly and hence we know that given alcohol is tertiary.

→ Secondary :-



This reaction takes time (about 5-10 minutes). Hence we know that given alcohol is secondary.

→ Primary :-



Primary alcohols don't react at room temperature.

— : Part (x) :—

Enzymes

↳ definition :-

Enzymes are protein molecules that alter the rate of reaction without itself being altered permanently.

↳ factors affecting enzyme activity :-

There are many factors that affect enzyme activity but due to the requirement of the question we will discuss the affect of pH and the affect of temperature.

↳ Affect of pH :-

pH has significant impact on the activity or efficiency of enzymes. There is no direct relation between pH and enzyme activity. Different enzymes work best at different pH. The optimum pH of most enzymes is 5-8. Pepsin work best at pH of 2 whereas trypsin works best at 8.

↳ Affect of temperature :-

Temperature has direct link or relation with enzyme activity. Enzyme activity increases with increase in temperature as a result of more collisions. However if

temperature is raised beyond a certain temperature known as optimum temperature, the enzyme denatures.

— : Part (xiii) : —

→ Methods of Analysis

There are many different methods of analysis of organic compounds such as,

- Infra-Red spectroscopy
- Magnetic Resonance Imaging
- UV spectroscopy
- Etc.

Here we will discuss IR spectroscopy and its applications.

↳ IR-spectroscopy :-

In IR spectroscopy, infra-red light waves are used to study a given organic compound.

It has many applications, some of which are given below.

↳ Applications :-

1) Identification

IR spectroscopy are important in identification of the sample of organic compound.

2) Progress of Reaction

It helps to show the progress of reactions of organic compounds.

3) Impurity Detection

IR spectroscopy is helpful in detection of impurity in the given sample.

4) Functional Group

IR spectroscopy can be used to detect the functional group in the given sample.

—: Part (xii) :—

smog

↳ definition

When smoke and fog combine they form a substance known as smog.

↳ Colour

It is yellow-brownish in colour.

Photochemical smog

↳ definition :—

A smog created by the industrial emissions and smoke and fog in the atmosphere is called photochemical smog.

↳ explanation :-

Photochemical smog is basically formed in the atmosphere. Here the emissions from industries react with smoke and fog under the influence of UV rays.

-: Part (viii) :-

Identification of Aldehydes

↳ Introduction :-

There are various methods for the identification of Aldehydes. Some of which

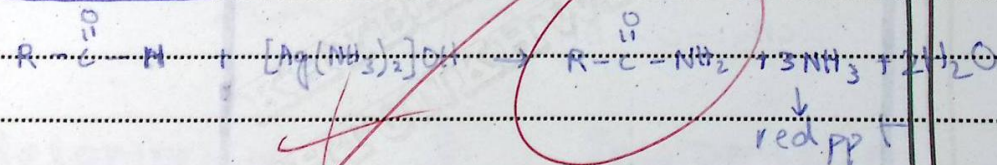
are,

- 1) Tollen's test
- 2) Fehling's solution test

1) Tollen's test

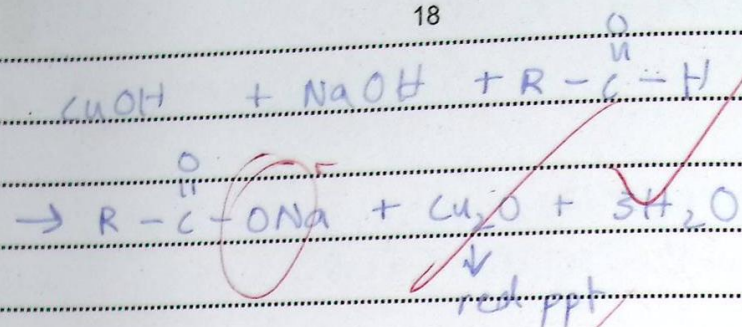
Tollen's test is used for identification of aldehyde. In Tollen's test, we react the Tollen reagent $[Ag(NH_3)_2]OH$ with aldehyde.

Reaction



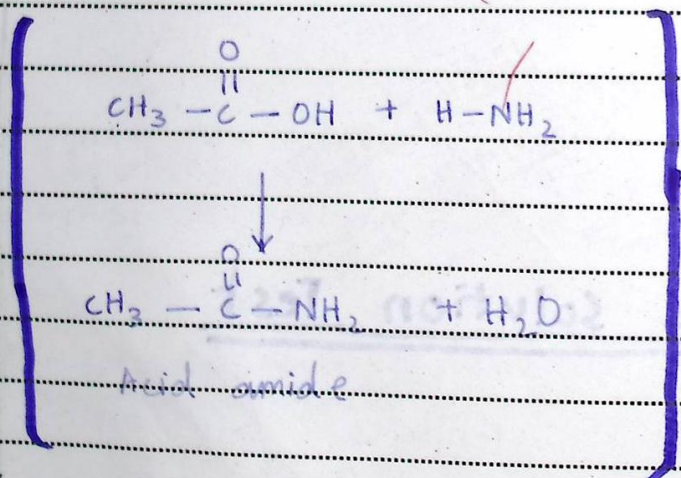
2) Fehling's solution Test

Fehling's solution Test is another method for the identification of aldehyde. We basically react the aldehyde with $Cu(OH)_2$.

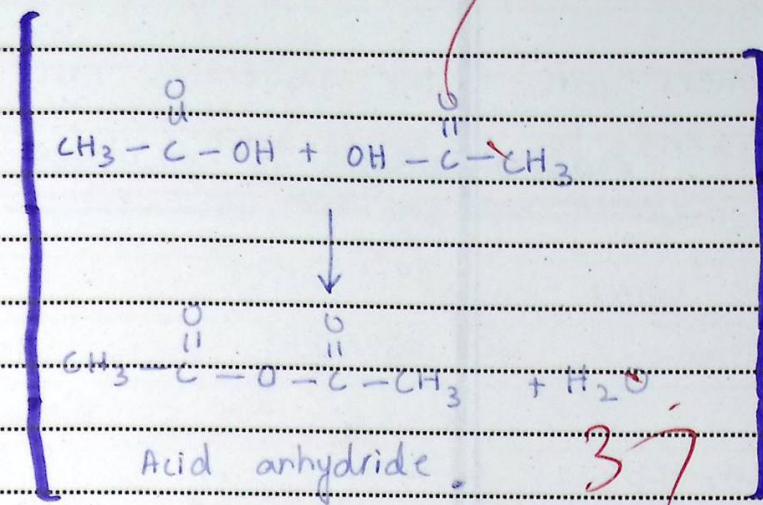


—: Part (ix) :—

Acid Amides



Acid Anhydrides



—: Part (iv) :—

Metamerism

In metamers, they differ from each other by number of atoms on either side of functional group.

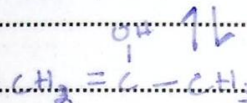
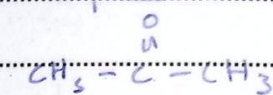
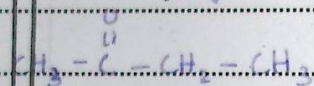
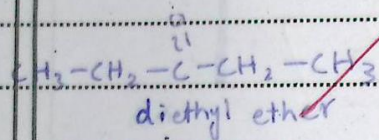
Tautomerism

In tautomers, they differ by the position of double bond or triple bond.

2) The metamers can exist independently of each other

The tautomers can exist only in equilibrium with each other.

Example



— : Part (vi) : —

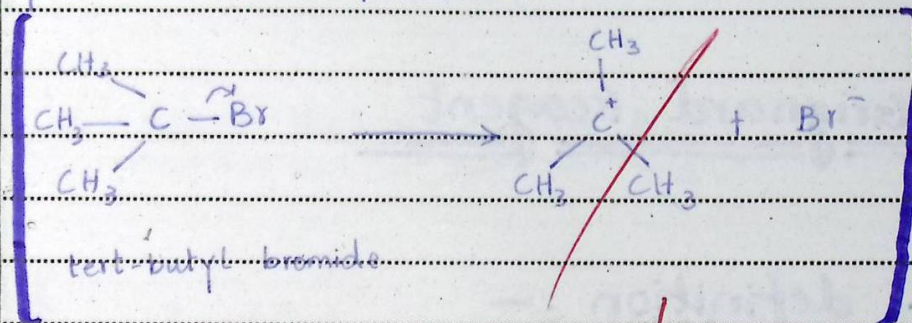
→ Tertiary Alkyl Halides Follow $\text{S}_\text{N}1$ Mechanism :-

we know that tertiary alkyl halides follow

$\text{S}_\text{N}1$ Mechanism.

Reasons & Explanation

we know that the first step of $\text{S}_\text{N}1$ mechanism proceeds as follows.



The three alkyl groups in the tertiary alkyl halide stabilizes the central carbon atom. Hence, the tertiary alkyl halide go through nucleophilic substitution reactions. Hence, they go through $\text{S}_\text{N}1$ mechanism.

SECTION — C

Q. No. 05 :-

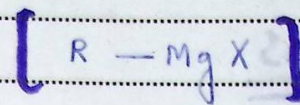
Grignard Reagent

↳ definition :-

"An alkyl or aryl group bonded to magnesium halide constitute Grignard Reagent."

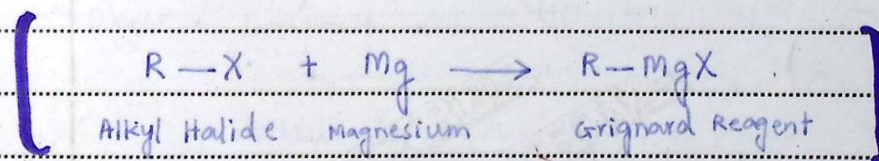
↳ formula :-

The general formula of Grignard Reagent is,



↳ Preparation

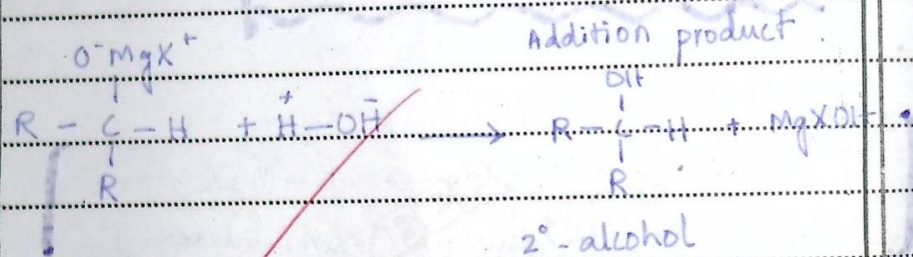
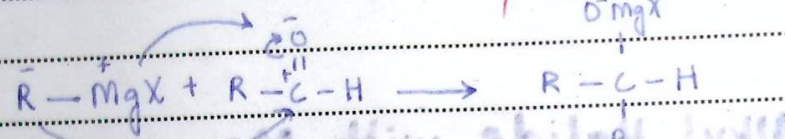
→ Alkyl Halide with Mg



Grignard Reagent is prepared by reacting alkyl halide and magnesium.

Chemical Reactions

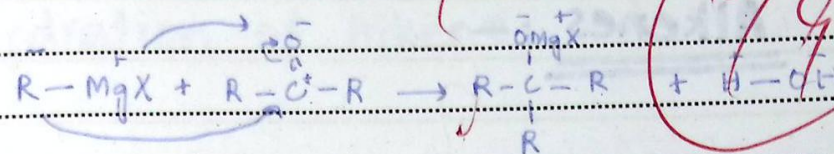
i) Aldehydes



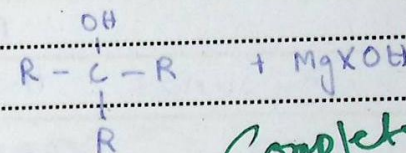
Hence, 2°-alcohol is produced by reacting R-MgX with aldehyde.

ii) Ketone

PTD



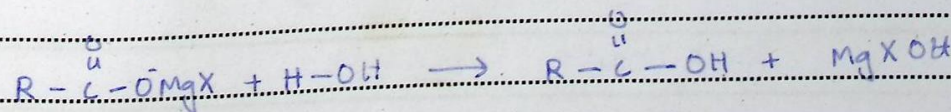
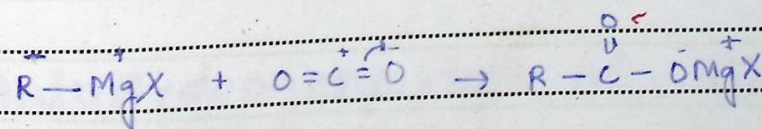
3°-alcohol



Hence, 3° alcohol is

produced.

iii) Carbon Dioxide



Carboxylic Acid

(8) ✓

Complete preparation and 3 reaction

Q. No. 04 :-

Alkenes :-

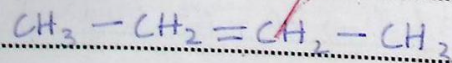
↳ definition

Alkenes are those organic compounds that contain a double bond.

↳ example



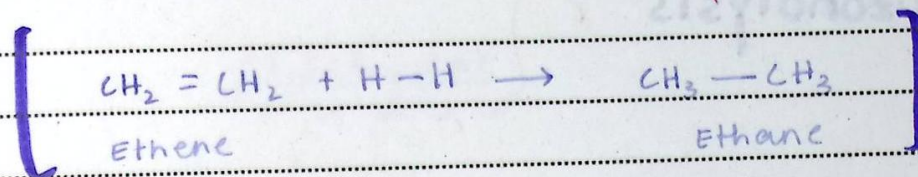
Ethene



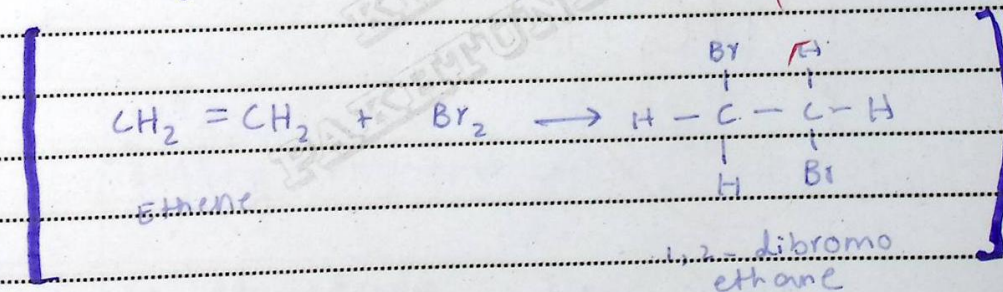
n-Butene

"Important chemical Reactions of Alkenes"

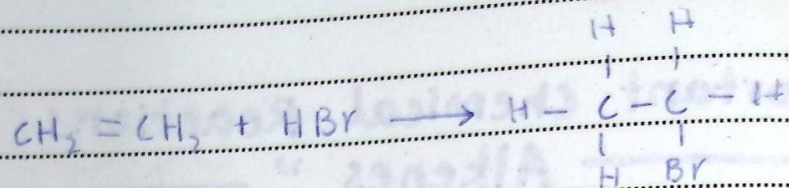
• Hydration of Alkene



• Halogenation of Alkene



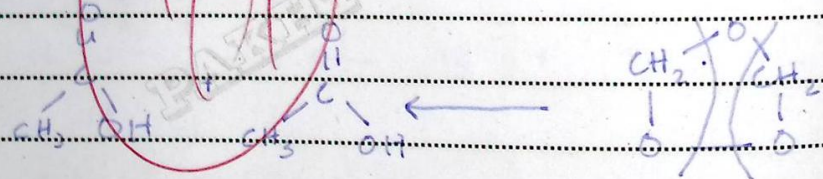
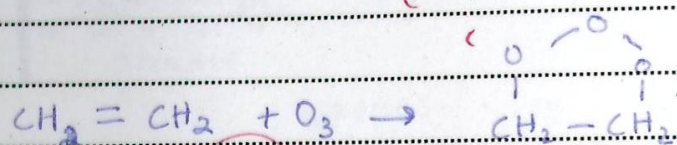
• Halohydrogenation of Alkene



Ethene

Bromo ethane

• Ozonolysis



Acetic acid

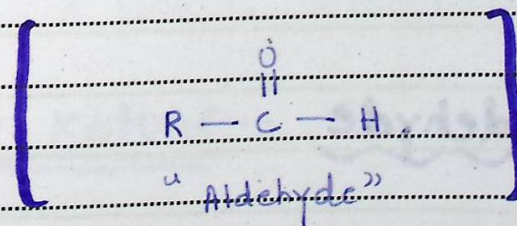
Q.No. 06 :-

Aldehydes

↳ def. :-

Aldehydes are derivatives of carboxylic acids having (-CHO) formula. Aldehydes are bonded to one alkyl group.

↳ structure

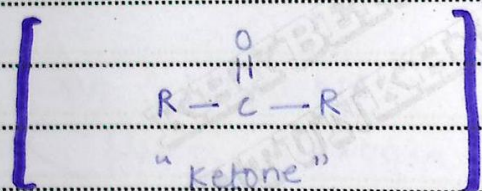


Ketones

→ def.

Ketones are carbonyl derivatives. They have two alkyl groups attached to them.

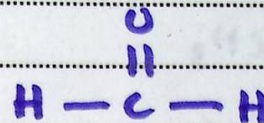
→ structure :-



"Structure of Aldehyde & Ketones"

→ For Aldehyde

To explain the structure of aldehyde, we will take formaldehyde as an example.

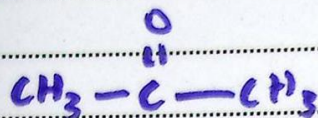


"Formaldehyde"

The above diagram is the structure of formaldehyde. It consists of a carbonyl group ($\text{C}=\text{O}$) and the carbonyl group is attached to two hydrogen atoms. The orbitals in this structure are sp^2 hybridized. The carbon atom's p orbital is bonded to hydrogen atom's s orbital. The angle formed at 108° between $\text{H}-\text{C}-\text{H}$ bond. π bond is present between C and O.

→ For Ketone :-

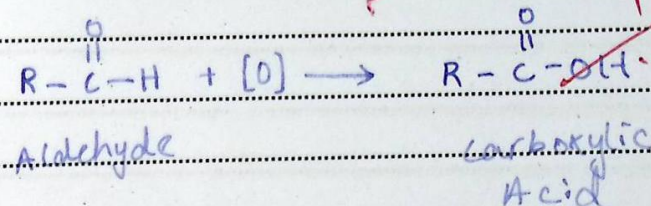
For Ketone, Let us take Acetone as example.



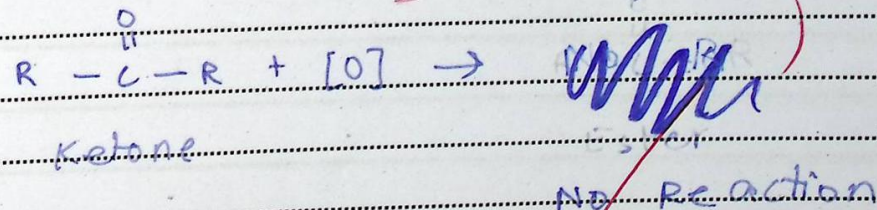
"Acetone"

The above diagram is the structural formula of acetone which is basically a ketone. It consists of a carbonyl ($\text{C}=\text{O}$) group and two methyl groups are attached to the carbon atom. The orbitals are sp^2 hybridized. There exists a π bond between C and O. The angle of $\text{C}-\text{C}-\text{C}$ bond is 108° .

→ Oxidation of Aldehyde



→ Oxidation of Ketone



No oxidation because of absence of α -hydrogen