

SECTION - B
(Short Questions)

(xi)

Write any...

(Ans)

USES OF PVC

Water Bottles :

PVC is used to create water bottles.

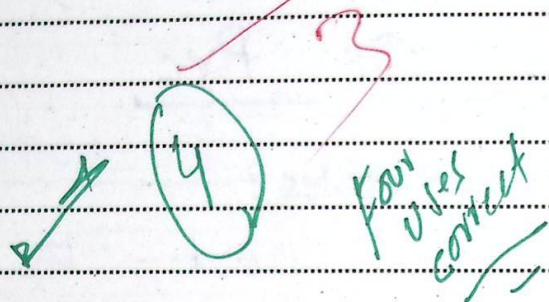
Pipes :

PVC is used to make PVC pipes that are used in homes.

Rexine :

PVC is used to make a leather like substance called rexine.

4. **Insulator :**
PVC is also used as an insulator in wires.



2. What...

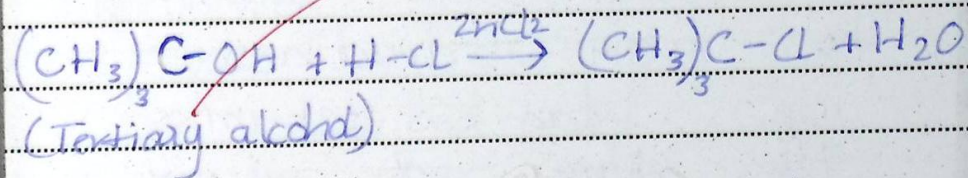
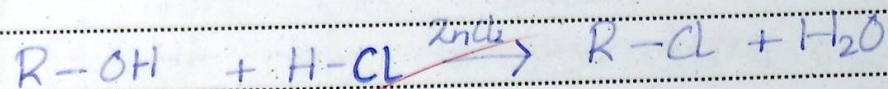
(Ans)

LUCAS TEST

Lucas Reagent : Lucas Reagent is the mixture of HCl and anhydrous $ZnCl_2$.

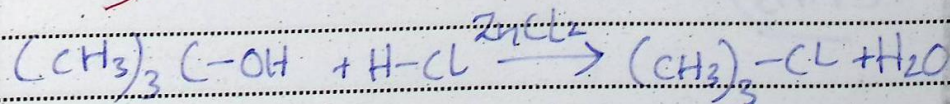
Reaction :

When alcohols react with HCl in presence of $ZnCl_2$, an alkyl halide is formed.

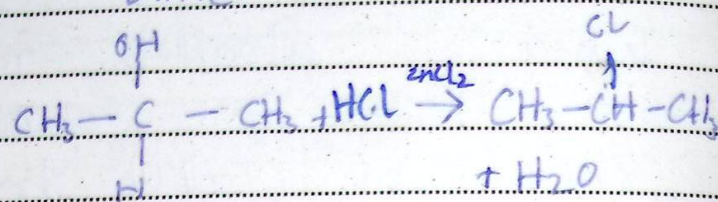


Distinguishing between Alcohol :

The alkyl halide appears as cloudiness on the tube. Since tertiary alcohol is more reactive towards HCl, the cloudiness will form immediately.



Secondary alcohol will take some time.



Primary alcohol will not react at all with HCl. From the time taken to form cloudiness, we can determine the type of alcohol.

(X)

3. What is...

(Ans)

EFFECT OF TEMPERATURE

AND PH ON ENZYME

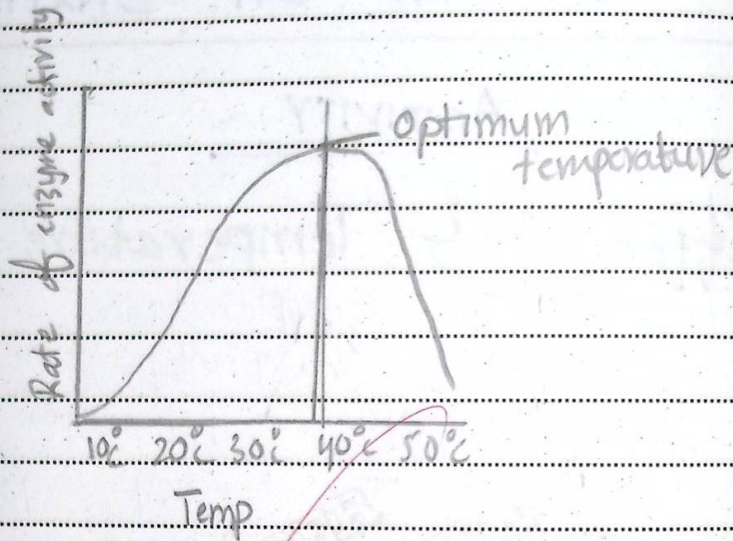
ACTIVITY

Effect of Temperature :

Effect of temperature on enzyme activity can be described by Q_{10} factor. For every 10°C rise in temperature, enzyme activity increases by 3 times, until it reaches optimum temperature where enzyme activity is maximum. Further heating causes denaturation of enzymes. Lowering temperature below optimum temperature slows enzymatic activity.

(Example):-

Most human body enzymes work best at $37^{\circ}\text{C} - 40^{\circ}\text{C}$.

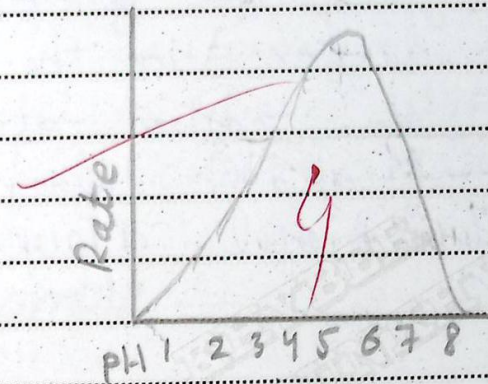


Effect of pH: Effect of pH varies from enzyme to enzyme. Some enzymes work best in acidic medium while others work best in basic medium.

(Example):-

Pepsin is an

enzyme that works best in acidic medium at about 2 pH. Most of the enzymes of human body work best at around 5-7 pH.



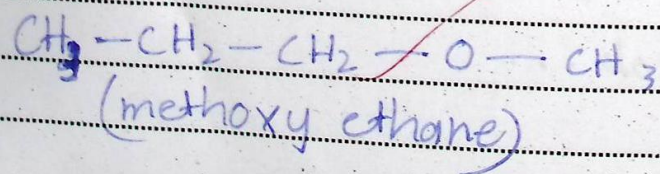
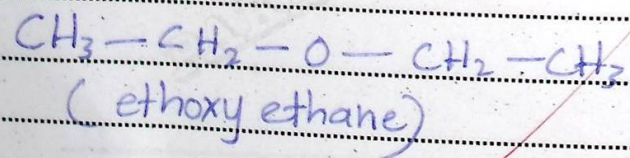
(iv)

What...

METAMERISM

Definition: Metamerism is the phenomena in which two molecules have the same molecular formula and functional group, but differ in the number of carbon atoms before and after the functional group.

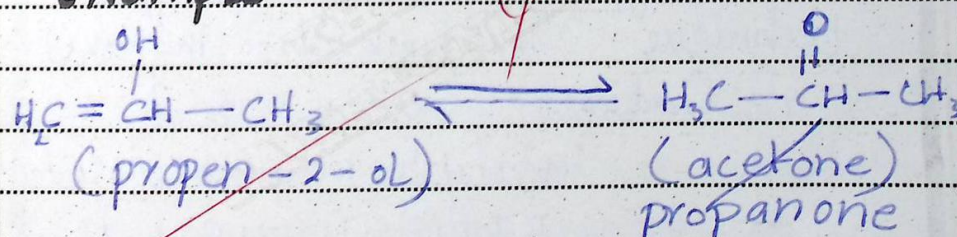
Example:



TAUTOMERISM

Definition: Tautomerism is the phenomena in which molecules differ in the position of proton and pi-electrons. In tautomerism, molecules will have different functional group.

Example:



The two molecules will exist in equilibrium.

5.

ix
(xiii)

How carboxylic...

(Ans)

(xiii)

5.

What...

(Ans)

IR SPECTROSCOPYDefinition:-

The type of spectroscopic technique in which infrared radiations are used to analyze the structure of organic compounds.

Radiation :: Radiation used is infrared.

APPLICATIONS

→ Spectrum : Functional Group region :- It is a part of IR spectrum that gives information about functional group.

→ Spectrum : Fingerprint Region - It is part of IR spectrum that gives information about the structure of the organic compound. Each compound has a different fingerprint region.

→ Presence of Impurities :-

↳ Different peaks in fingerprint region :: Different peak

in fingerprint region
indicate some sort of
impurity is present.

→ **Accurate Result:** IR spectroscopy gives accurate result as compared to other methods.

→ **Less Time:** It is less time consuming.

(i)

What ...

(Ans)

IONIZATION ENERGY

Definition :- It is the amount of energy required to remove the outermost electron of an isolated gaseous atom.

High Ionization Energy of

Phosphorus: The electronic configuration of phosphorus is :- $1s^2, 2s^2, 2p^6, 3s^2, 3p^3, 3d^0, 3f^0$

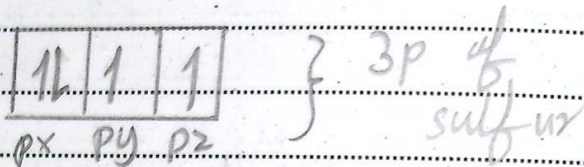
1	1	1			
p _x	p _y	p _z			

(3)

No Example

Since half-filled electronic configuration is more stable, therefore it is

harder to remove valence electron. If we compare it to the 3p of sulfur, we get.



Sulfur has a tendency to lose valence electron in order to gain half-filled stable configuration. Therefore, less I.E. is required.

Thus, I.E. of phosphorus is higher than sulfur.

(iii)

What is...

(Ans)

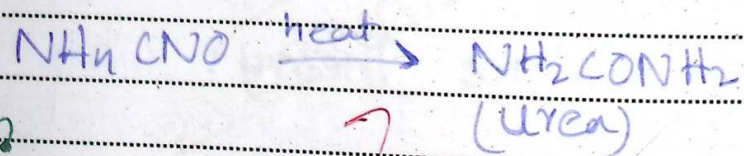
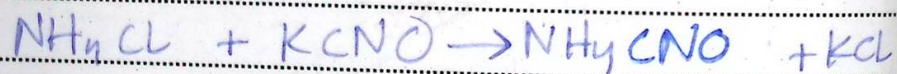
WOHLER'S WORK

Definition / Introduction :

Wohler's work is of great importance as it disproved the vital force theory.

Vital Force Theory: Vital force theory states that there is a vital force present in organic compounds.

Wohler's Reactions: Wohler formed urea from ammonium chloride and potassium cyanide to form urea, and thus disproved vital force theory which ~~stated that organic compounds can not be found in nature.~~



This reaction disproved vital force theory and proved organic compounds can be formed in laboratory.

Previously, it was thought that organic compounds can not be synthesized in laboratory.

(ii)

What...

(Ans)

Typical Transition Elements

Definition: Those elements that show properties of regular transition elements such as variable valency.

Example: Transition elements from IVB to IB such as Cr, Mn etc.

Non-Typical Transition Elements

Definition: Those transition elements that do not show properties of regular transition elements such as variable valency.

Example: Elements from III B and II B such as Sc, Y, Zn, Cd

④ Complete

(ix)

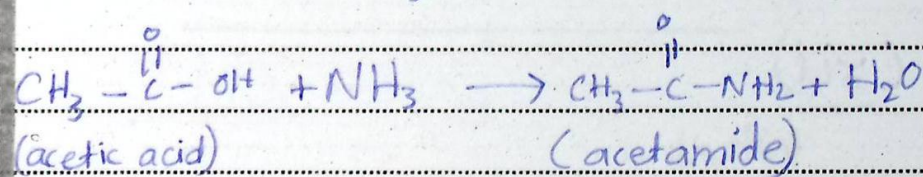
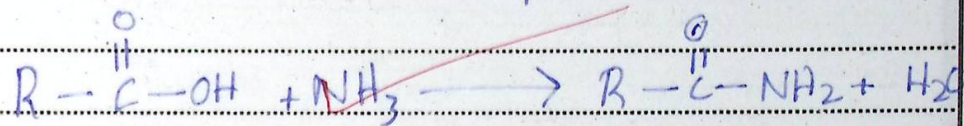
9.

How ...

Ans

Formation of Acid Amide from Carboxylic Acid

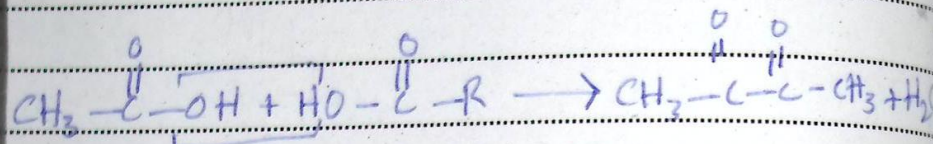
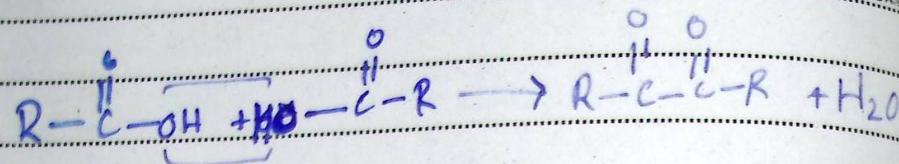
Acid anhydride is formed when carboxylic acid reacts with NH_3 . Water is released in this process.



Formation of Acid

Anhydride

Acid anhydride is formed when water is removed from two carboxylic acids.



(xLi)

10.

What...

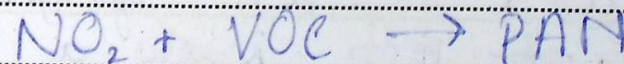
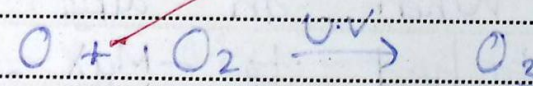
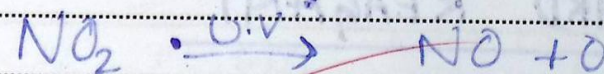
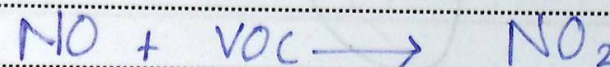
(Ans)

PHOTOCHEMICAL SMOG

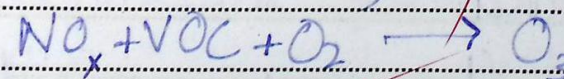
Definition : When NO_2 , hydrocarbon and oxygen react in the presence of D.V light to form ozone.

Formation :

When NO_2 , hydrocarbon and oxygen react, we get O_3 .



(Overall reaction)



SECTION - C

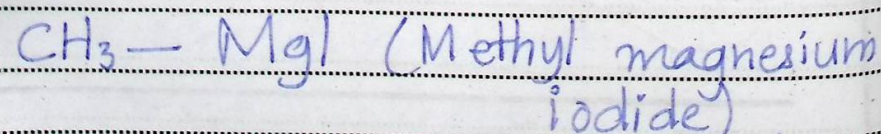
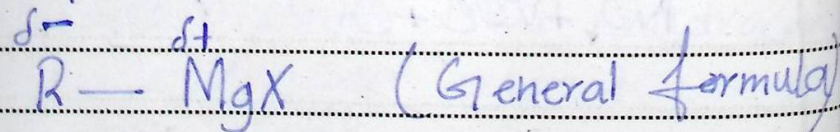
Q.5.

What.

Ans.

GRIGNARD REAGENT

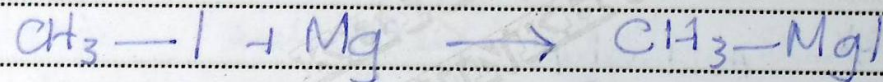
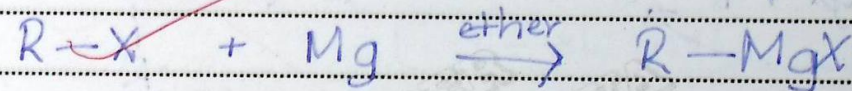
Definition: When an alkyl group is attached to $-MgX$, it is called a grignard reagent. It is a magnesium containing organometallic compound.



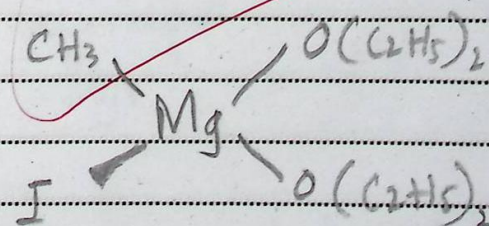
The partial negative charge makes it

a nucleophile.
Preparation:

Grignard reagent is formed when alkyl halide reacts with solid magnesium in diethyl ether's presence. Diethyl ether provides anhydrous medium for the reaction.

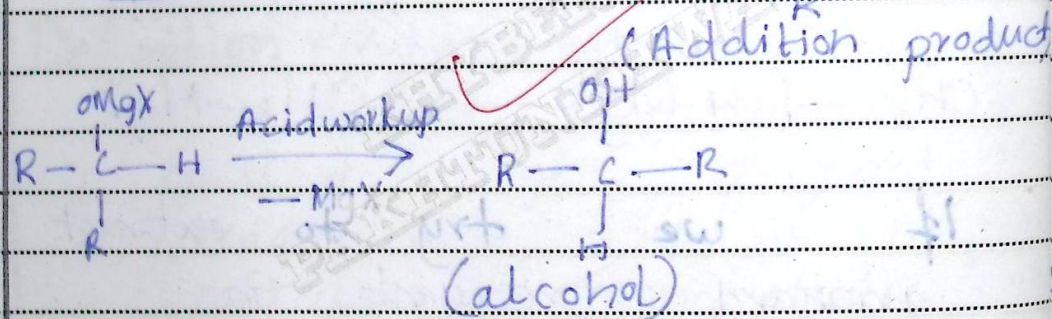
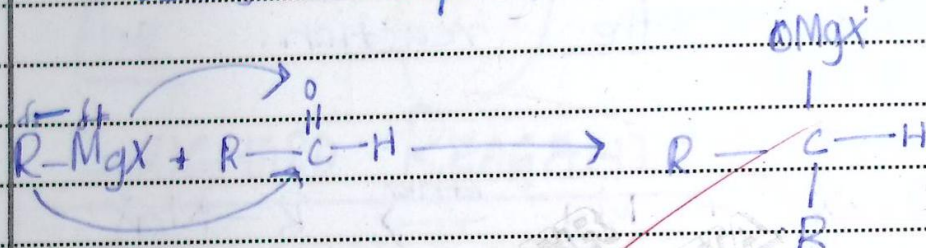


If we try to extract grignard reagent in crystalline form, magnesium also becomes dietherate.

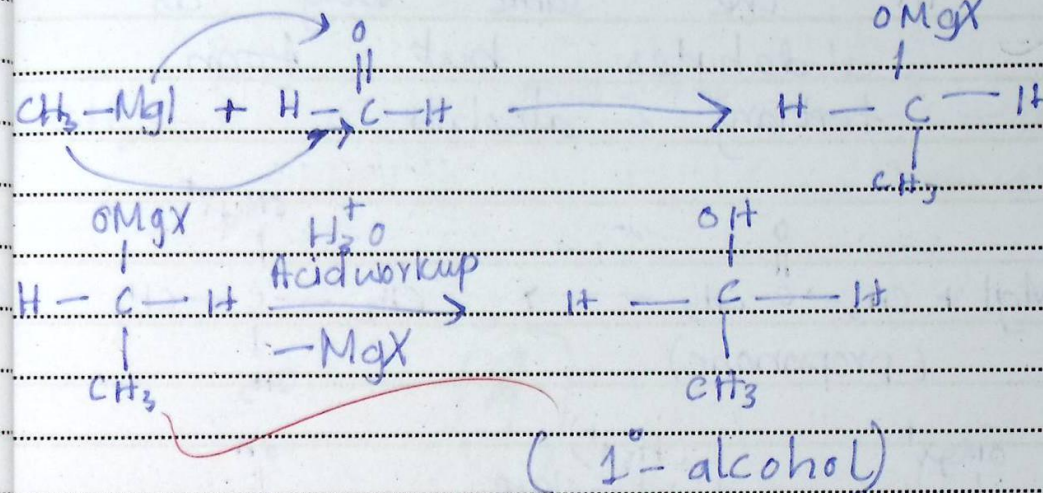


Reactions

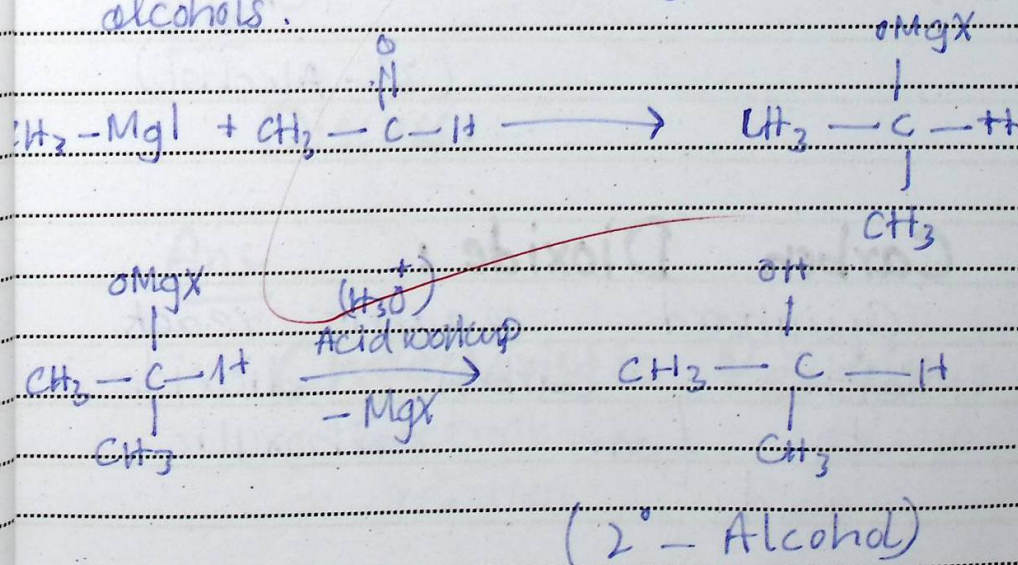
→ **Aldehydes**: Aldehydes react with grignard reagent to form alcohol through addition product intermediate.



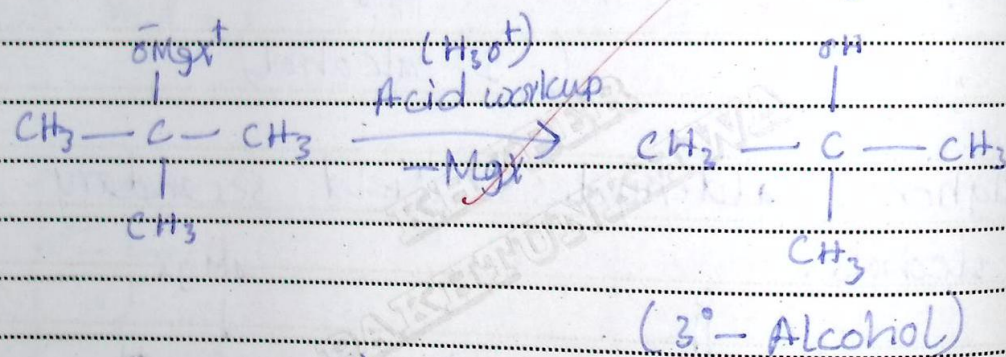
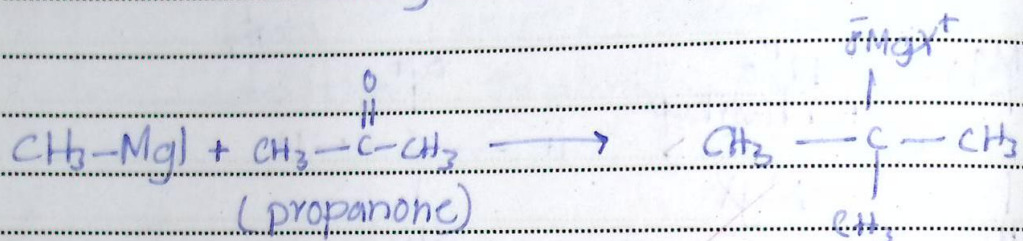
formaldehyde produces primary alcohol.



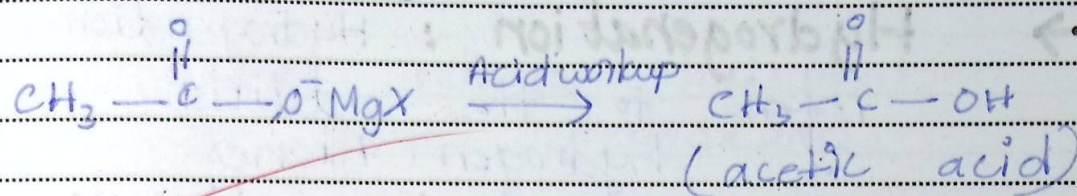
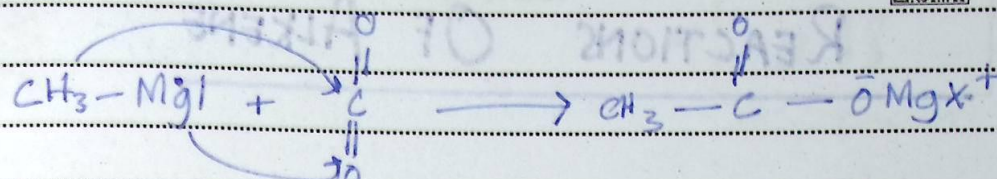
Higher aldehydes yield secondary alcohols.



→ **Ketones:** Ketones react with Grignard reagent in the same way as aldehydes but form tertiary alcohols.



→ **Carbon Dioxide:** Grignard reagent reacts with carbon dioxide to form carboxylic acid.



9

Q.4.

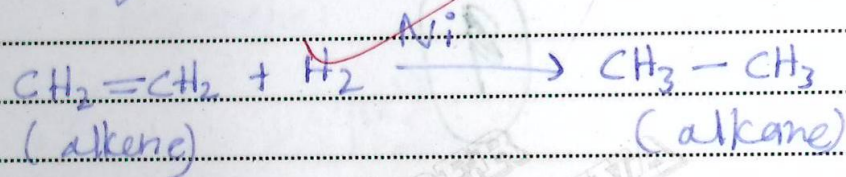
Discuss...

Ans.

Characteristic Reaction:
Electrophilic addition reaction.

REACTIONS OF ALKENE

→ **Hydrogenation** : Hydrogenation refers to the addition of hydrogen. Alkenes undergo hydrogenation to form alkanes.

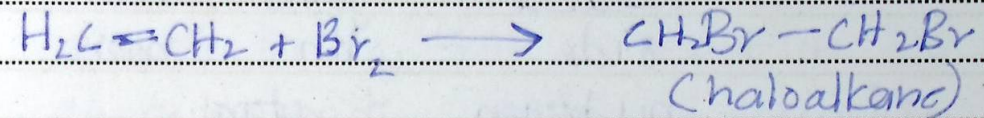


The catalyst is Ni/Pd etc (catalytic hydrogenation).

This reaction is used to convert vegetable oil to ghee.

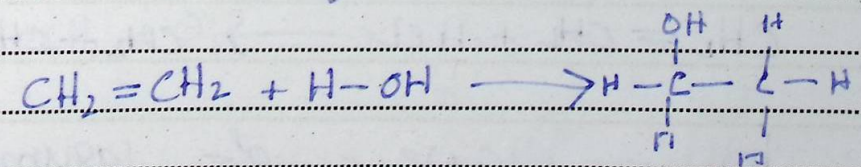
→ **Halogenation** : It refers to the addition of halogens.

Alkenes undergo halogenation to form haloalkanes.

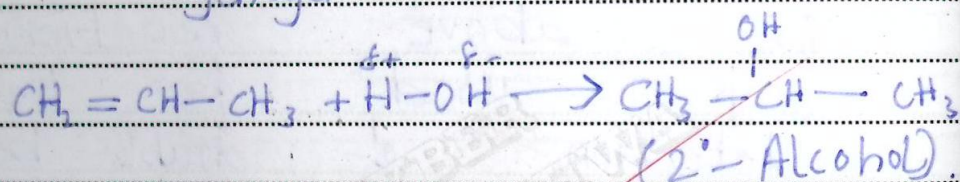


The above reaction is used for the detection of double bond. It is called bromine water test.

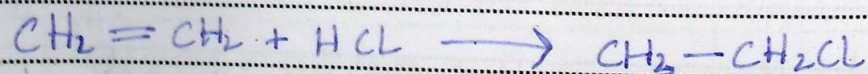
→ **Hydration** : Alkenes add a water molecule to form alcohol.



In case of asymmetric alkenes, the reaction follows Markovnikov's rule. According to this rule, the positive part of the substance being added joins the side with more hydrogen atoms.

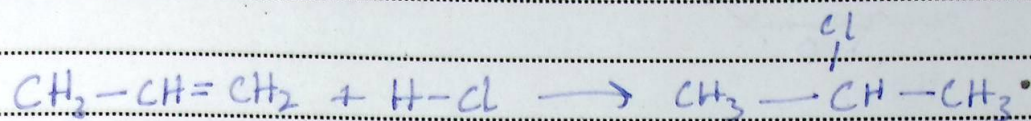


→ **Addition of Hydrogen Halide:** Alkenes can also add hydrogen halides

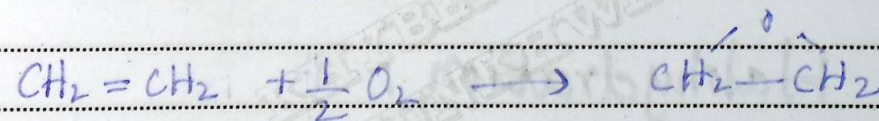
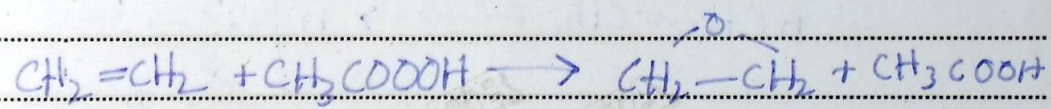


In case of asymmetric

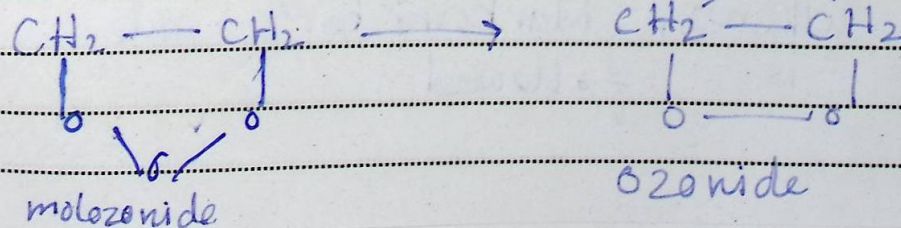
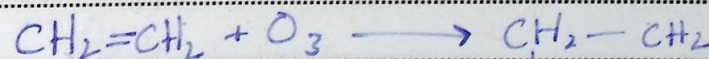
alkenes, the reaction follows Markovnikov's rule.

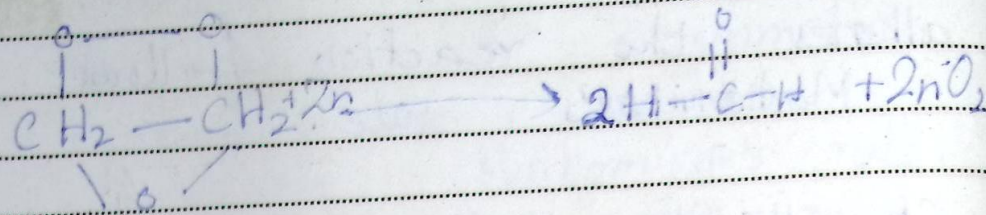


→ **Epoxidation:** It is another characteristic reaction of alkene. In this reaction, alkene reacts with a peracid

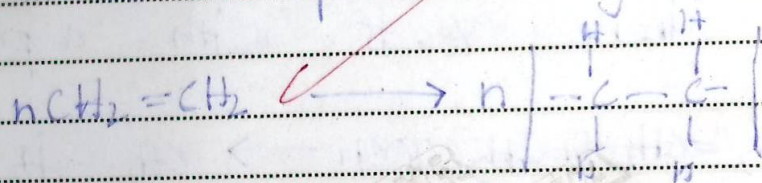


→ **Ozonolysis:** Alkenes also undergo ozonolysis.

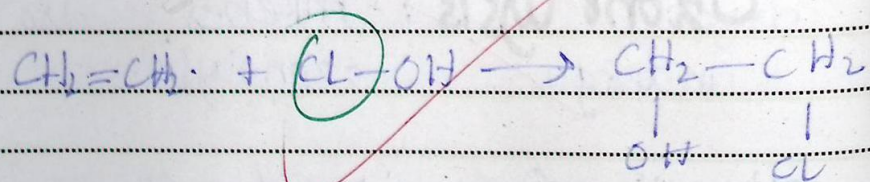




→ **Polymerization**: It is the process where small monomers make up a big product.



→ **Halohydration**: It is another reaction of alkene.



In case of asymmetric alkenes, Markovnikov's rule is followed.

Q3.

Discuss...

Ans

Alkaline Earth Metals:
Alkaline earth metals refer to elements of group - IIA.

Solubility of Hydroxides:

The solubility of hydroxides increases as we move down the group.

$\text{Be}(\text{OH})_2$, $\text{Mg}(\text{OH})_2$:

$\text{Be}(\text{OH})_2$ is insoluble in water. $\text{Mg}(\text{OH})_2$ generally appears insoluble, however when the solution is stirred thoroughly and pH value is determined, it shows 9.0 pH. Hence

some part of it has dissolved.

$\text{Ca}(\text{OH})_2$: It readily dissolves in water. It forms Ca^{2+} and 2OH^- ions. The pH of this solution is 11.0. Hence, it shows more solubility than $\text{Mg}(\text{OH})_2$.

$\text{Ba}(\text{OH})_2$: It dissolves into Ba^{2+} and 2OH^- ions. The pH of this solution is very high.

Solubility of Sulphates:

Solubility of sulphates decreases down the group. This effect is followed if we take

hydrated beryllium sulphate
($\text{BeSO}_4 \cdot 5\text{H}_2\text{O}$) . This trend
is broken at BaSO_4

Solubility of Carbonates:

Solubility decreases as we move down the group in case of carbonates of group-II. But BaCO_3 dissolves because distance between both ions is large and it becomes easier to break this bond.

Factors Affecting Solubility
Solubility depends on

→ **Lattice Energy:** Lattice energy is inversely proportional to solubility.

→ **Hydration Energy:** Hydration energy is also inversely proportional to solubility.

→ **Explanation:** Both lattice energy and hydration energy decrease down the group. In hydroxides, the effect of decreasing lattice energy dominates effects of decreasing hydration energy. In case of sulphates

and carbonates, the
opposite is true.

Conclusion: Due to the above
mentioned effects, solubility
of hydroxides increases
down the group. In
case of sulphates
and carbonates, solubility
decreases down the
group.