SECTION B

QUESTION 2

ANSWER THE FOLLOWING QUESTION

ANSWERS

(i)

IONIZATION ENERGY:-

Ionization Energy is the energy required to remove an electron from the valence shell of the outermost orbital.

IONIZATION ENERGY OF PHOSPHOROUS IS GREATER THAN SULPHUR:-

IONIZATION ENERGY TREND ACROSS THIRD PERIOD:-

Na Mg Al Si P S Cl Ar

→ Ionization energy increases.

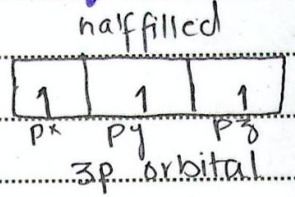
Ex

REASON:-

Ionization energy increases across the 3RD period However phosphorous comes earlier than the sulphur but still its ionization energy is greater than the sulphur which past the phosphorous. According to trend, Phosphorous must have low ionization energy than the Sulphur but still its energy is greater than the sulphur because Phosphorous is having half filled p orbital and sulphur is having partially filled p orbital and thus, the greater ionization energy is required to remove electron from the half filled

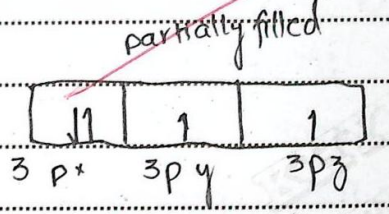
p orbital than the partially p orbital.

ELECTRONIC CONFIGURATION OF PHOSPHORUS :-



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

ELECTRONIC CONFIGURATION OF SULPHUR.



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

ii

LUCAS TEST :-

Lucas test is a test which

is used to determine whether the Alcohol is tertiary, primary, and secondary. Determination :-

It is a test which is used to determine whether the Alcohol is tertiary, primary or secondary. We know that the reactivity of tertiary is greater.

LUCAS TEST:-

Alcohol is t

Lucas Reagent:- Lucas reagent is Hydrochloric acid in the presence of the Anhydrous zinc chloride.

Lucas Test:-

Alcohol is treated with the Hydrochloric Acid in the presence of the Anhydrous zinc chloride.

$$R\text{-}OH + HCl \xrightarrow{ZnCl_2} RCl + H_2O$$

Alcohol — Hydrochloric Acid — Alkyl Halide (cloudiness) — Water

Result :-

When the Alcohol is treated with the hydrochloric Acid in anhydrous zinc chloride it forms the Alkyl Halide and Water. Alkyl Halide forms cloudiness

Determination Of Alcohol:-

Tertiary Alcohol:- Alcohol is determined because the reactivity of tertiary Alcohol is greater and it produces immediately cloudiness by forming Alkyl Halide. • **Secondary Alcohol:-**

After sometime the secondary Alcohol forms the Alkyl Halide and appears cloudiness • **Primary Alcohol:-**

Primary Alcohol doesnot react with the hydrochloric acid at room temperature.

(iii)

METAMERISM:

"In metamerism, the two molecules are isomers of eachother but there is unequal distribution of carbon atoms on either side of the functional group."

Explanation:

The two molecules are called metamers and they are isomers of eachother but there is unequal distribution of carbon atom on either side of functional group. Both are having same functional group and have same molecular formula.

Example:

$CH_3-CH_2-O-CH_2-CH_3$

diethyl ether

$CH_3-CH_2-CH_2-O-CH_3$

methyl propyl ether

- Same functional group
- Unequal Distribution of carbon Atoms

TAUTOMERISM:

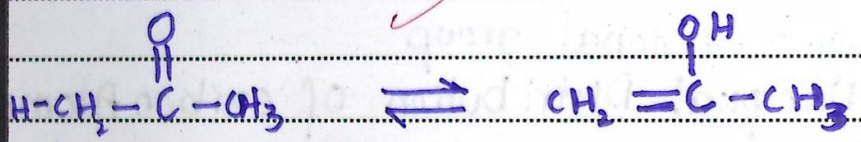
"In tautomerism, both isomers differ from eachother in the hydrogen or the pi bond."

Explanation

Both the isomers are having same molecular formula but they differ from eachother in pi bond or the hydrogen.

They are in dynamic equilibrium with eachomer and both of can interchange with themselves depending upon the concentration

Example:



Acetone

Dynamic Equilibrium

iv

TOLLEN'S TEST :

Tollen's Reagent:

Tollen's reagent is the ammonical silver nitrate which is formed by adding

ammonia to the silver nitrate. It is water soluble. It is Diamine silver hydroxide

$[Ag(NH_3)_2]OH$

TEST:

When the aldehyde is mixed with the tollen's reagent the aldehyde changes to carboxylate ion and the silver ion changes to the metallic silver which deposits on the test tube and form silver mirror which is called the "Silver Mirror Test."

$$R\text{-}CHO + 2Ag(NH_3)_2OH \longrightarrow RCOONH_4 + 3NH_3 + H_2O + 2Ag\downarrow$$

Fehling solution:

Reagent:

Fehling solution consist of reagent which is cupric ion and the tartarate.

Test:-

When the Aldehyde is mixed with the Fehling solution the Aldehyde changes to the carboxylate ion while the cupric ion is changed to cupric oxide which is red precipitate.

Importance:-

Determination Of Aldehyde And Ketone:-

It is important because it is used to determine aldehyde and ketones because ketone donot react with these tests and donot undergo oxidation.

V

FOUR USES OF POLYVINYL CHLORIDE:-

REXINE:-

Polyvinyl chloride is used to make special type of leather called rexine.

PIPES:-

It is used for the manufacturing of pipes and pipes in drainage system.

INSULATING WIRES:-

It is used as an insulating material in the wires.

BOTTLES:-

its used for manufacturing of bottles.

BLOOD BAGS :

It is used in formation of blood bags.

PVC Flooring:

It is used for flooring.

Vi

ENZYME:

Enzyme catalyze the activity of the reactions wimout getting involved.

EFFECT OF TEMPERATURE ON ENZYME:

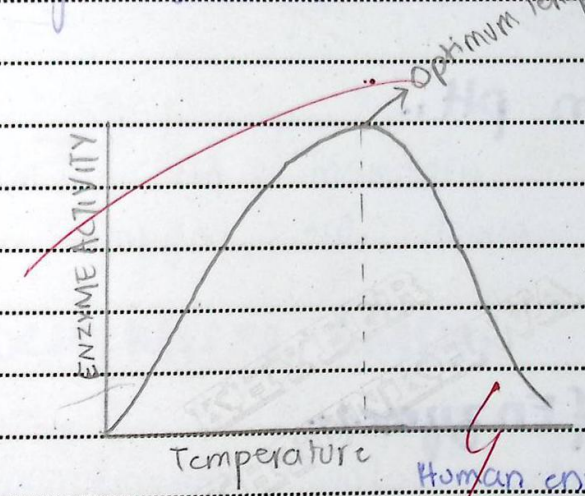
ENZYME ACTIVITY INCREASE WITH TEMPERATURE:

Enzyme activity increase with the temperature but upto certain temperature and after

that temperature the enzyme activity decreased and start the denaturation.

Optimum Temperature:

Optimum temperature is the temperature at which the enzyme activity is maximum.



Human enzyme works at 37°C

EFFECT OF PH ON ENZYME ACTIVITY:

PH has a great effect on the enzyme activity. Different

enzyme work at different pH.
some enzyme work best in acidic while some of them work in the acidic medium.
Enzymes depend on the pH and have a great effect.

Optimum pH:-

Optimum pH is the pH at which the enzyme activity is maximum.

Most of Enzymes:-

Most of the enzymes work best at 5-9 pH.

Example:

Trypsin enzyme is present in stomach and is an exception and it works best at 1-2 pH.

Vii

PHOTOCHEMICAL SMOG:-

SMOG:-

Smog is the mixture of smoke and the fog.

PHOTOCHEMICAL SMOG:-

It is the smog which is formed by the different photochemical reactions of the pollutants present in the environment.

Photochemical smog is formed by different reactions in the environment.

FORMATION:.

Nitrogen oxide is present in the environment and it reacts with the oxygen present in the environment and form nitrogen dioxide and oxygen radical. Oxygen radical reacts with the oxygen and form ozone. sowhen the ozone is present in the group level it blurs the vision and called photo chemical smog.

Reaction:

$$NO + O_2 \longrightarrow NO_2 + [\dot{O}]$$

$$[\dot{O}] + O_2 \longrightarrow O_3$$

ozone at ground level form the smog. and Nitrogen dioxide react with VOCs to form PAN.

$$NO_2 + VOCs \rightarrow PAN$$

viii

Geometrical Isomerism:.

In the geometrical isomerism both have same molecular formula but different spatial arrangement of carbon atoms.

CONDITIONS:.

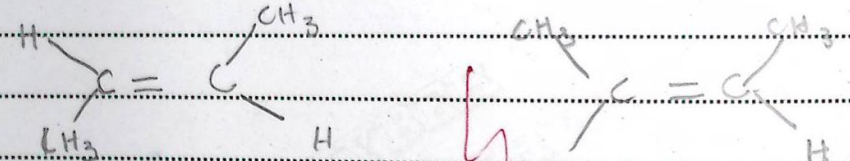
CARBON ATTACHED TO TWO DIFFERENT ATOMS.

The condition for geometrical isomerism is that the carbon must attached to two different atoms. If carbon is attached to similar atoms then

geometrical isomerism is not possible.

Restriction Of Double Bond:-

In geometrical isomerism, the carbon double bond is restricted and it cannot be rotated by rotation of double bond.
There is no rotation of double bond.



trans isomer

cis isomer

ix

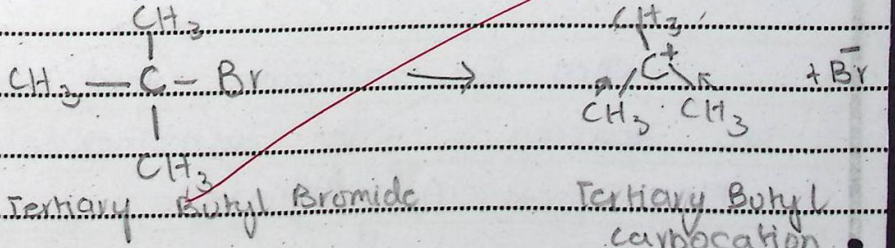
TERTIARY ALKYL HALIDE FOLLOW

SN1 MECHANISM:-

SN1 :- substitution Nucleophilic Unimolecular because one molecule is involved

Explanation:-

Tertiary Alkyl Halide follow the Sn1 Mechanism because the carbocation which is formed is balanced by the Alkyl Group attached. The Alkyl Groups are electron donating groups so when they are bonded to carbocation they balance the positive charge of the carbon. The tertiary Alkyl Halide follow Sn1 Mechanism because the carbocation which is formed by the release of Halogen is balanced by the Alkyl groups.

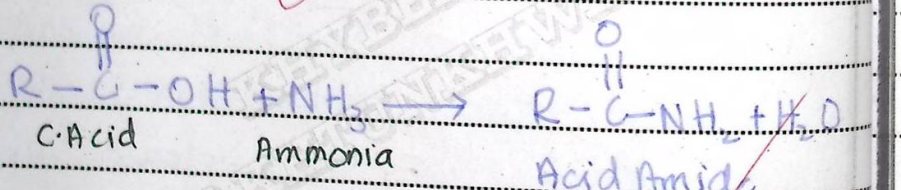


Tertiary Butyl Bromide

Tertiary Butyl carbocation

CARBOXYLIC ACID TO ACID AMIDE:

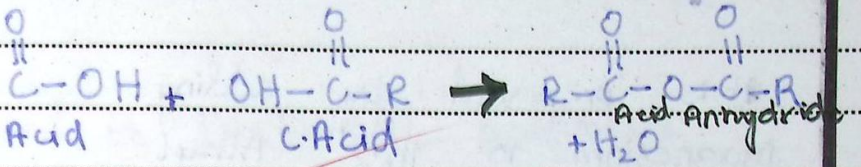
carboxylic Acid can be converted to the Acid Amide by reacting carboxylic Acid with Ammonia and water is released.



CARBOXYLIC ACID TO ACID ANHYDRID

When two carboxylic acid are reacted with eachother they form Acid Anhydride

Reaction:



SECTION "C"

GRIGNARD REAGENT:

Grignard reagent consist of the organometallic compound in which the carbon is bonded to the metal. Grignard reagent consist of

- Alkyl Group
- Metal
- Halogen

R-MgX

Preparation:

It is prepared by adding Magnesium to the Alkyl Halide.

$$R-X + Mg \rightarrow R-MgX$$

Formation Depordance:

Its case of formation depends upon the

Alkyl Group

If more Alkyl Groups are attached its formation becomes difficult.

Halogen:

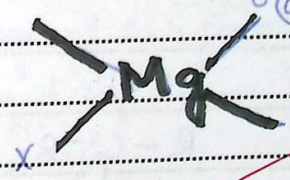
It also depends upon the halogen. Bromide and Iodide are mostly used while more Bromide is used.

Prepared in Dicheral Solution

It is prepared in diethyl ether solution which gives

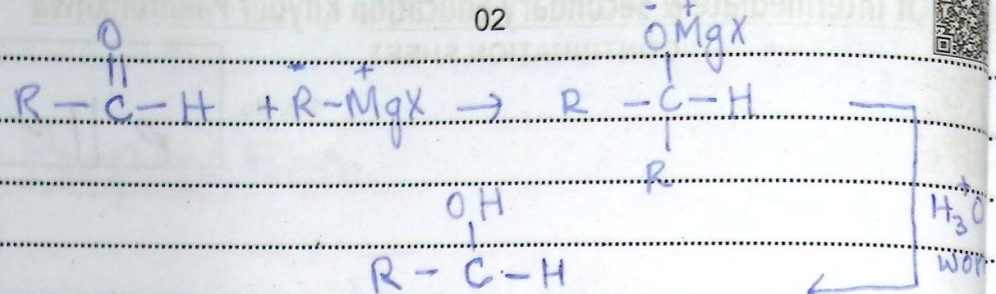
- Medium
- Solvation

When it is crystallised from dicheral solution the two diethyl ether are attached to magnesium.



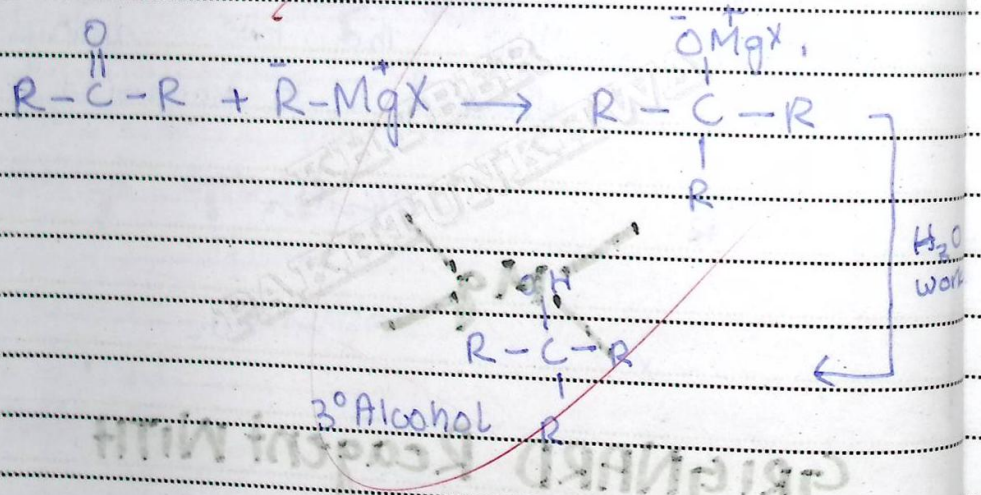
GRIGNARD Reagent WITH ALDEHYDE:

Grignard Reagent is reacted with the Aldehyde. It form primary Alcohol.



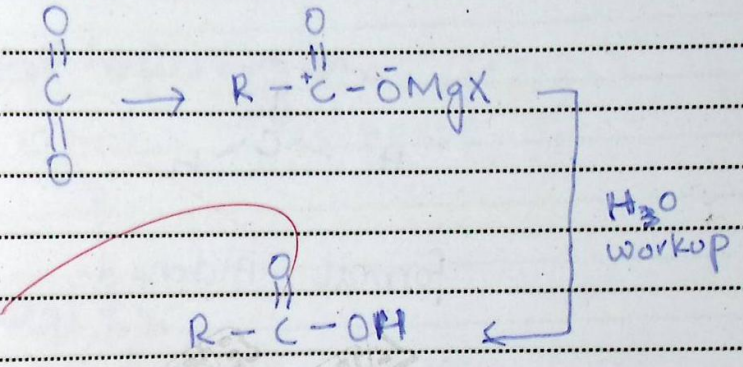
It form the primary Alcohol

GRIGNARD REAGENT WITH KETONE :-



When Grignard Reagent react with ketone it form Tertiary Alcohol

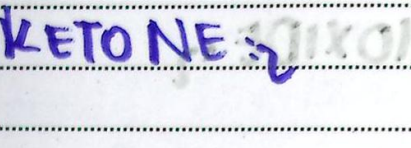
GRIGNARD REAGENT WITH CARBON DIOXIDE :-



when Grignard Reagent react with Carbon dioxide, then the carboxylic Acid is formed.

ANSWER (6)

STRUCTURE OF ALDEHYDE AND KETONE:-



formal Aldehyde

To discuss the structure of Aldehyde and ketone it basically consists of the

Carbonyl Group

which is bonded to oxygen. There is double bond between the carbon and oxygen. The carbon is bonded to Hydrogen and Alkyl Group.

Hybridization of carbon:-

The hybridization of carbon is sp^2.

Hybridization of Oxygen:-

The hybridization of Oxygen is sp^2.

BOND ANGLE:-

Bond Angle between them is approximately equal to 120°.

Shape:

They have a trigonal planar structure.

OXIDATION OF ALDEHYDE:-

Oxidation of Aldehyde gives us the carboxylic Acid. This reaction is done in the

presence of the dichromate.

$$R-\overset{O}{\overset{\|}{C}}-H + [O] \rightarrow R-\overset{O}{\overset{\|}{C}}-OH$$

carboxylic Acid.

OXIDATION OF KETONE :-

Oxidation of ketones involves the breaking of carbon carbon bond because there is no Alpha hydrogen present.

$$CH_3-\overset{O}{\overset{\|}{C}}-CH_3 + 4[O] \rightarrow CH_3-\overset{O}{\overset{\|}{C}}-OH + CO_2 + H_2O$$

ANSWER * 2

Alkenes :-

Alkenes have carbon to carbon double bond. They are also called oleifins Formula is C_nH_{2n}

Reactions :-

Hydration :- (Addition of water)

Hydration of Alkenes give us the ethyl alcohol which is done in the presence of H_2SO_4

$$CH_2=CH_2 + HOH \xrightarrow{H_2SO_4} CH_3-CH_2-OH$$

Ethyl Alcohol

Hydrogenation:

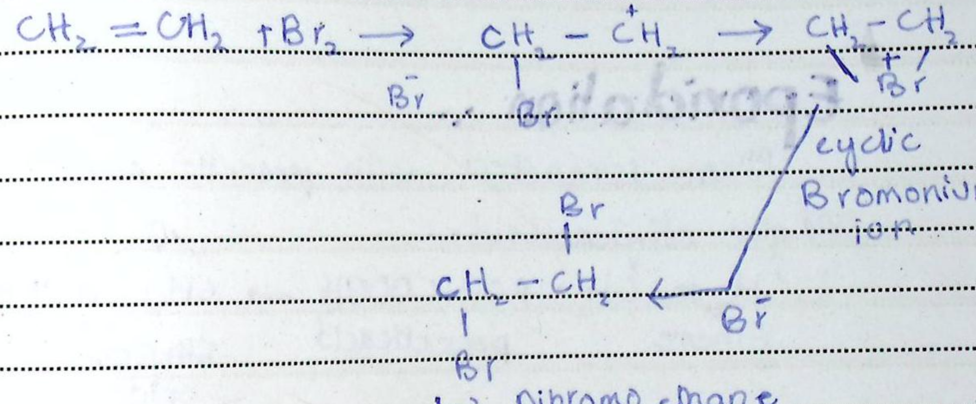
Hydrogenation means the addition of Hydrogen to the Alkene in the presence of Ni or Platinum catalyst at 150-200°C temperature. It gives the product ethane

$$CH_2 = CH_2 + H_2 \xrightarrow[1\text{-}5\,atm]{Ni} CH_3 - CH_3$$

Ethane

HALOGENATION:

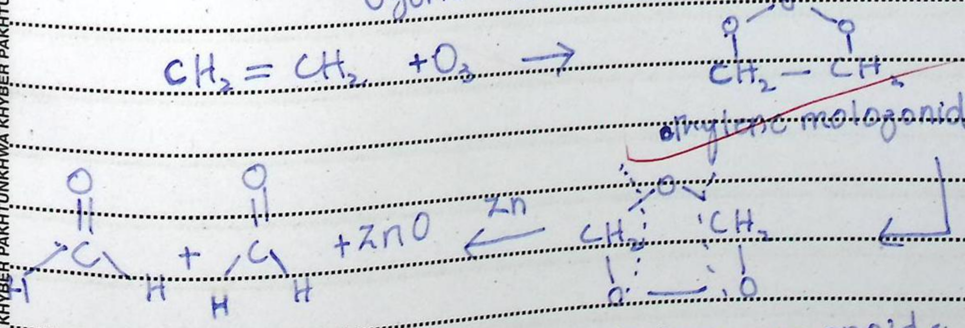
Halogenation means the addition of Halogen to the Alkene. Then Alkene forms the cyclic Bromonium ion and form the 1,2 dibromoethane



1,2 Dibromo ethane

OZONOLYSIS:

Ozone is added to ethene



ethylene ozonoide

2 Formaldehydes are formed and zinc oxide is formed.

Epoxidation :-

Alkene is reacted with peracetic acid and give ethylene oxide.

$CH_2 = CH_2 + CH_3COOOH \rightarrow CH_2-CH_2 + CH_3CO$

Ethene — peraceticacid — Ethylene oxide

It forms the ethylene oxide and give the acetic acid.