بسم اللہ الرحمن الرحیم

(THE MOST MERCIFUL AND BENIFICIAL)

SECTION - B

Q. NO_2

PART —— (i)

IONIZATION ENERGY:

The energy required to remove an electron from valence shell of gaseous atom.

PHOSPHORUS HAVE HIGHER I.E THAN SULPHUR:

REASON AND EXPLAINATION:

Electronic configuration of Phosphorus P_{15} :

$1s^2, 2s^2, 2p^6, 3d^5$

Electronic configuration of Sulphur S_{16} :

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

Sulphur should have greater I.E because of greater number of electrons and atomic radius as per conventions. But phosphorus have half filled 3d orbital which means greater stability.. Half-filled and full-filled 3d orbitals are evidence of greater stability.

CONCLUSION:

Hence greater energy would be required to remove electron from more stable atom. Hence, Phosphorus have higher ionization energy due to greater stability.

PART —— (vii)

LUCAS TEST:

Lucas test is used to distinguish between primary, secondary and tertiary alcohols.

IMPORTANT REQUIREMENT: (LUCAS REAGENT)

Zinc chloride ($ZnCl_2$) and concentrated Hydrochloric acid is used.

GENERAL REACTION:

$$R-OH + HCl \rightarrow R-Cl + H_2O$$

This is general reaction

which shows how Lucas Test works.

DISTINCTION BETWEEN ALCOHOLS:

⇒ Primary Alcohols will react readily and Cloudness will appear in container.

⇒ Secondary Alcohols will react after sometime and cloudness would appear after some time.

⇒ Tertiary Alcohols do not react with Lucas Reagent because of steric hinderance provided by three Alkyl groups.

PART — (ix)

CONVERSION OF CARBOXALIC ACID INTO ACID AMIDES AND ACID ANHYDRIDE:

1) CONVERSION OF (COOH) INTO ACID AMIDE.

GENERAL REACTION:

$$R-NH_2 + R-\overset{O}{\overset{\|}{C}}-OH \rightarrow R-\overset{O}{\overset{\|}{C}}-NH_2 + R-OH$$

EXAMPLE:

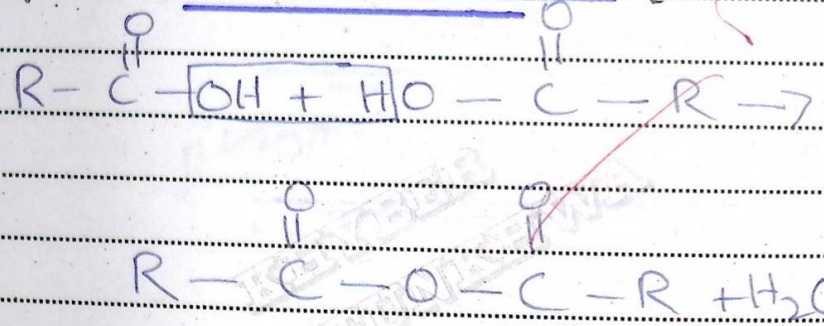
$$CH_3-NH_2 + CH_3-\overset{O}{\overset{\|}{C}}-OH \rightarrow CH_3-\overset{O}{\overset{\|}{C}}-NH_2$$

(1° Amine) (Acetic Acid) (Acetamid)

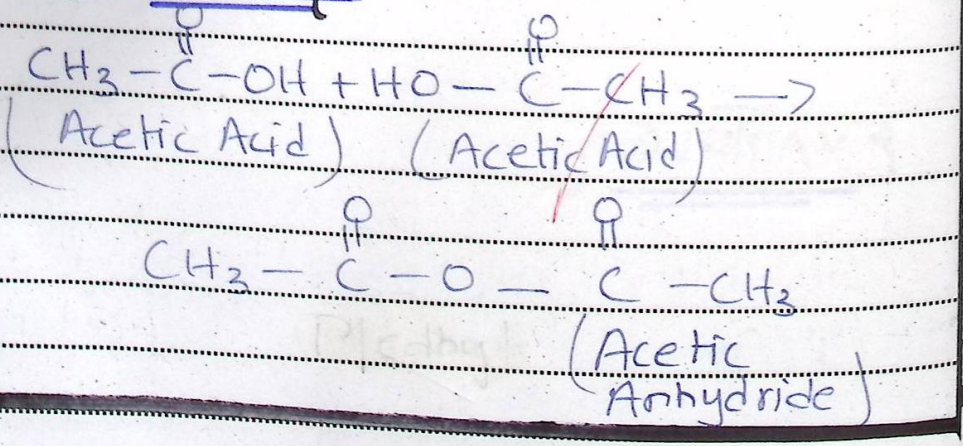
+ CH_3-OH
(Methyl Alcohol)

CONVERSION OF COOH INTO ACID ANHYDRIDE:

GENERAL REACTION:



EXAMPLE:



PART — (iii)

WOHLER WORK:

Wohler was first person to synthetically develop an organic compound.

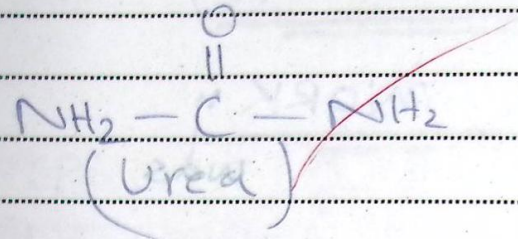
It was first believed that organic compound only originates from natural sources.

Consequently, it was evidence for rejection of Berzelius' famous "vital force" theory.

UREA:

Wohler created Urea in laboratory which is an organic compound.

STRUCTURE OF UREA:



IMPORTANCE OF WORK:

It opened the gateway for production of thousands of organic compounds which are necessary requirements in our daily life. Nowaday industries millions of organic products.

EXAMPLE:

Food, polyesters, adhesives etc.

PART —— (vi)

SN1 REACTION:

SN1 means substitution Unimolecular involves nucleophile. It means it is of order 1 as reaction depends on only one compound. It doesn't involve collision of two molecule.

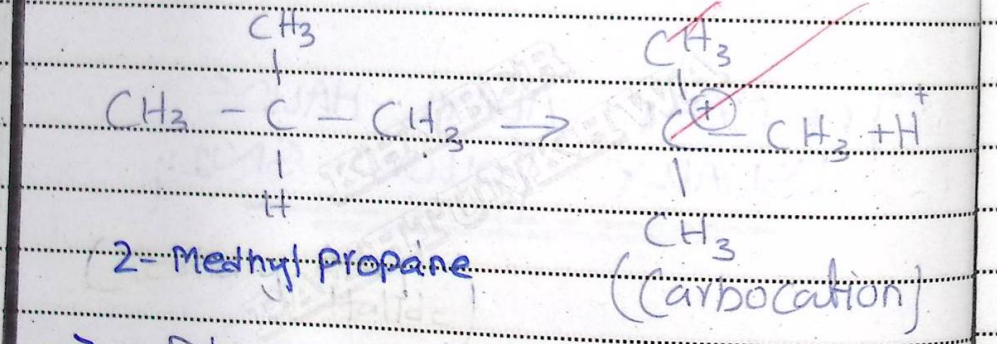
TERTIARY ALKYL HALIDE USUALLY FOLLOW SN1:

As there are three Alkyl groups attached to central carbon which creates steric hindrance for upcoming nucleophile due to repelsion of electrons. So SN_2

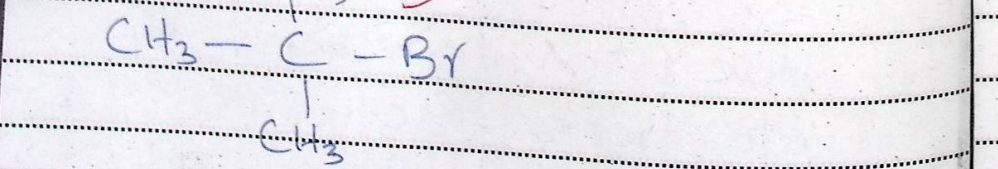
mechanism cannot be happened in reactions involving tertiary Alkyl Halide.

DIFFERENCE:

→ Tertiary Alkyl halides first have to be ionized



→ Now nucleophile will come and attack positive Carbon

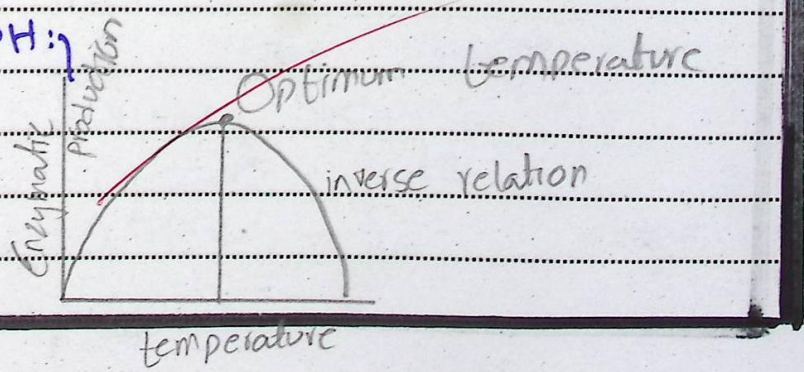


PART — (x)

EFFECT OF TEMPERATURE ON ENZYME:

With increase in temperature, fruitfull collisions increase due to which enzymatic reaction also get faster. Upto certain temperature called optimum temperature, this direct relation exists. After that enzymatic reactions decrease by increasing temperature.

GRAPH:



EFFECT OF PH ON ACTIVITY OF ENZYMES:

There is also relation between PH and enzyme activity. There is range of PH under which enzymatic activity increases. There is maximum enzymatic activity on certain PH called optimum PH. Enzymatic activity depends on acidic and basic natures of compounds.

PART — (xii)

PHOTOCHEMICAL SMOG:

Smog is combination of fog and smoke. Photochemical smog is one of they types of smog.

It is created when emission of different gasses like (NO_2) from automobiles spread in air and react with abundant ozone under (Ultraviolet) light.

It is very dangerous for human beings. It can create fatal radiations.

CREATION OF PHOTOCHEMICAL SMOG:

REACTION:

NO_2 + Ozone (O_3) + Light → (photochemical smog)

∴ It is one of the reasons for termination of ozone layer.

PART — (ii)

TYPICAL TRANSITION METALS:

Those metals which have half-filled or full-filled d-orbitals in valence shell are called typical transition metals.

EXAMPLE:

Copper Cu_{29}

Electronic configuration:

$[Ar], 3d^{10}, 4s^1$

↓

full filled d-orbital.

Chromium Cr_{24}

E.C: $[Ar], 3d^5, 4s^1$

↓

half-filled d-orbital.

NON-TYPICAL TRANSITION METALS:

Those transition metals which have partially filled d-orbitals in valence shell are called non-typical transition metal.

EXAMPLE:

Scandium Sc^{21}

Electronic configuration:

$[Ar], 3d^1, 4s^0$

(partially-filled d-orbital)

PART — (viii)

TOLLEN'S TEST:

Tollen's test is used for detection of aldehydes. Tollen reagent is ammonical silver Nitrate formed through initial dissolution of ammonia in Silver Nitrate.

MECHANISM:

When aldehyde is reacted with this solution, aldehyde is converted carboxylate ions and metallic silver is deposited on container which looks like mirror. Thats why this is called silver mirror test.

REACTION:

$$2RCHO + 2[Ag(NH_3)_2] \rightarrow RCO^- + 2H_2O + 2NH_3 + 2Ag\uparrow$$

(Metallic Silver)

FEHLING SOLUTION:

Fehling solution is also used for detection of aldehydes. Here copperous ions are used to react with aldehydes. Aldehydes convert into carboxylate ions and copperous ions are converted into copper.

REACTION:

$$2RCHO + 2Cu^{2+} + 5OH^- \rightarrow RCHO^- + 2CuO_2 + 3H_2O$$

PART — (xi)

Uses of PVC's:

→ It is used in manufacturing in polyethene bags.

→ It is used in manufacturing of leather.

→ It is used in manufacturing of pipes

→ It is used for different designs of wall panels.

SECTION - "C"

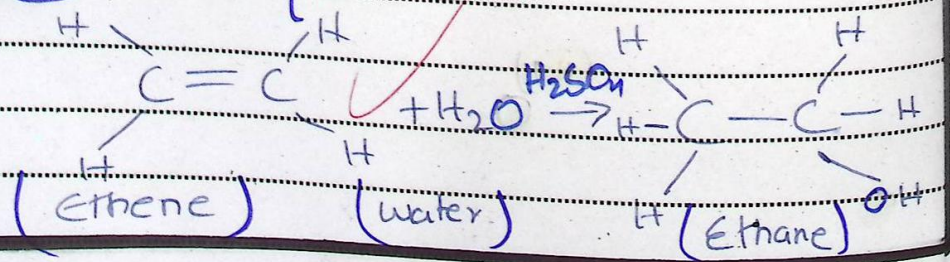
Q.NO 4

IMPORTANT CHEMICAL REACTIONS OF ALKENES:

HYDRATION:

When alkene is reacted with water, double bond breaks with addition of H-OH.

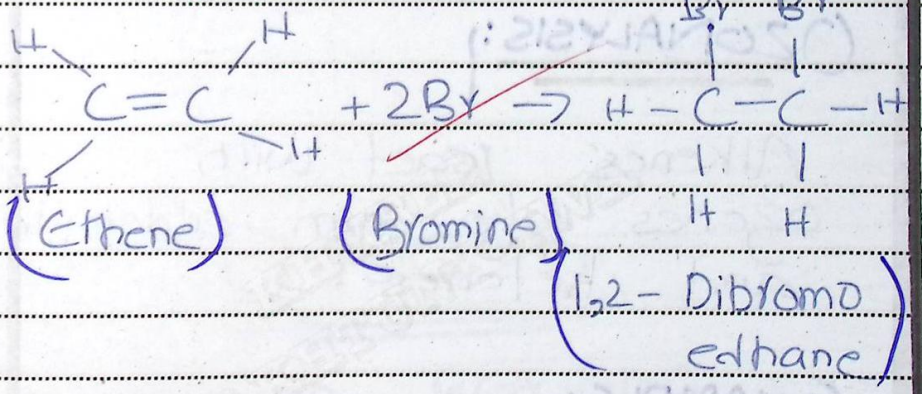
EXAMPLE:



HALOGENATION:

When two halogen atoms react with alkene, double bond breaks and 2 halogen atoms are added.

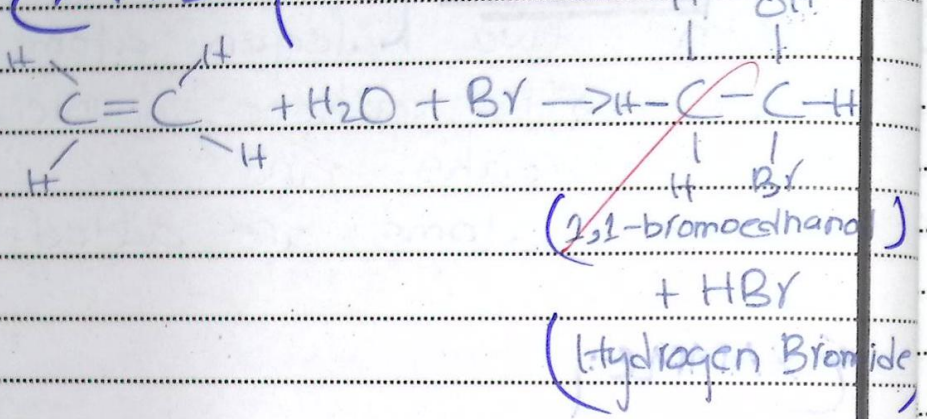
EXAMPLE:



HYDROHALOGENATION:

When (OH) from water and halogen is added to alkene, alkene double bond breaks and converts into alkane.

EXAMPLE:



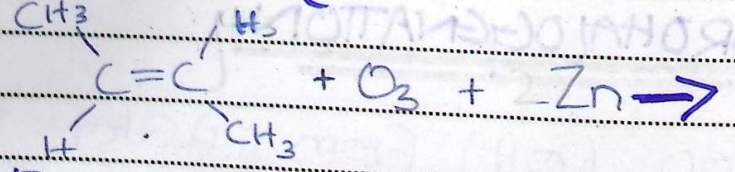
(2,1-bromoethanol)

(Hydrogen Bromide)

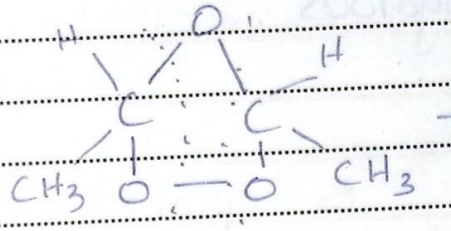
OZONALYSIS:

Alkenes react with ozones to form aldehydes and ketones.

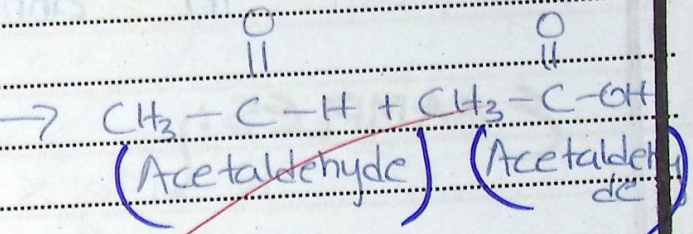
EXAMPLE:



(Trans But-2-ene)



(Ozonide)



(Acetaldehyde) (Acetaldehyde)

(zinc oxide)

Q.NO 5

GRIGNARD REAGENT:

Grignard Reagent is reagent formed by reaction of Alkyl group with Magnesium and halogen atom.

PREPARATION:

Grignard Reagent is created by passing Alkyl group over freshly prepared Magnesium metal in anhydrous ether.

EXAMPLES:

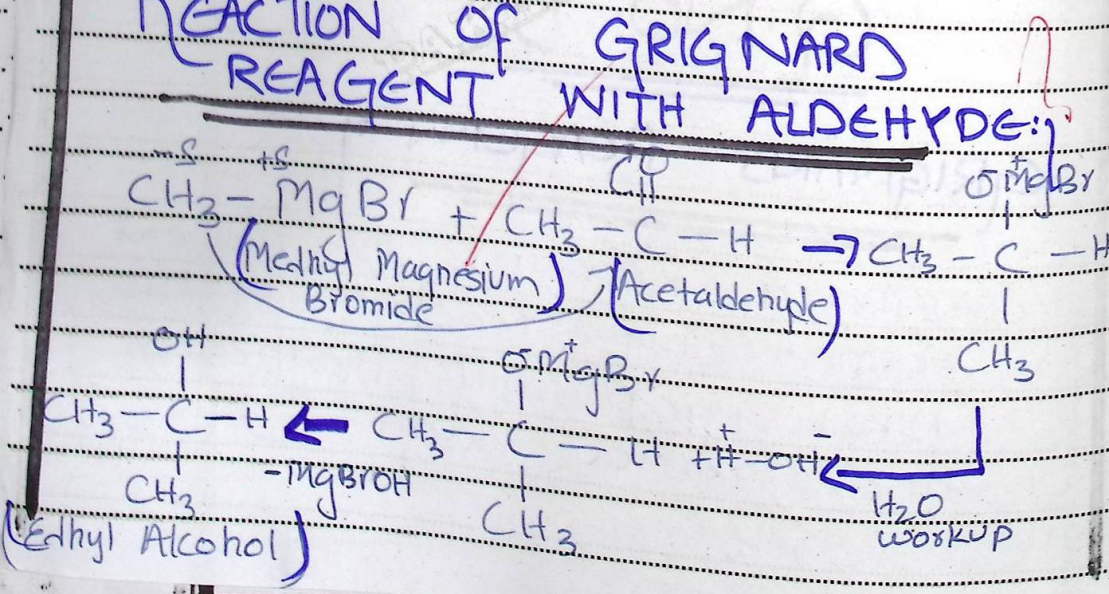
R-MgX is general form

→ CH_3-MgI

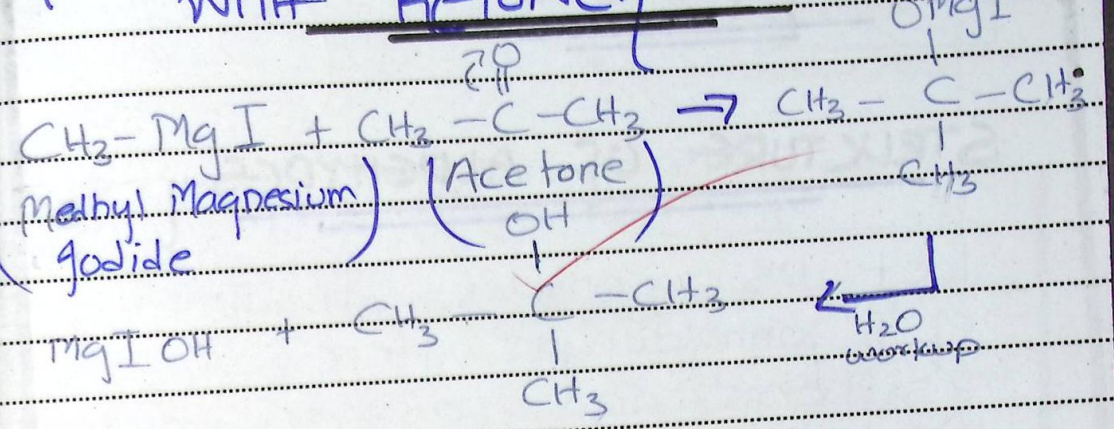
→ C_2H_5-MgF

→ CH_3-MgBr

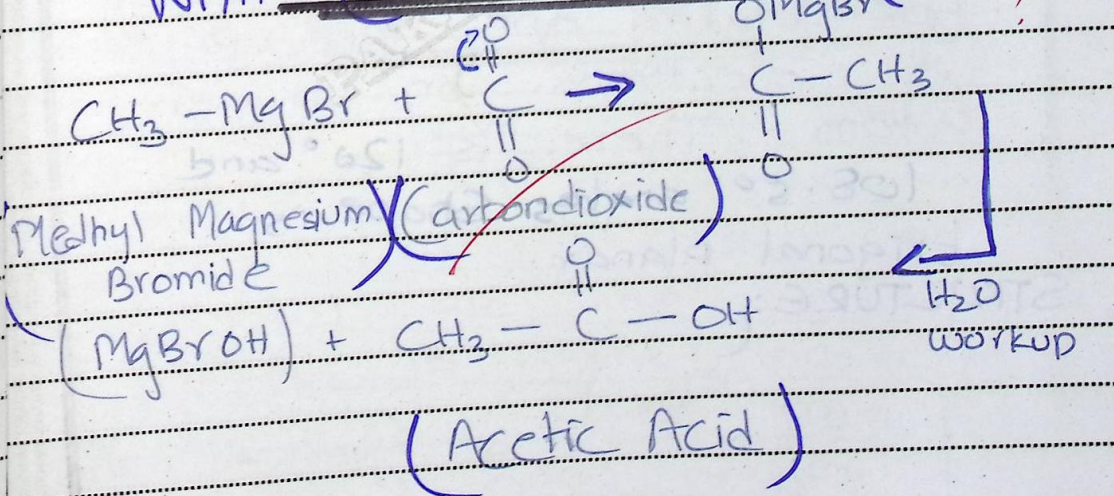
REACTION OF GRIGNARD REAGENT WITH ALDEHYDE:



REACTION OF GRIGNARD REAGENT WITH KETONE:



REACTION OF GRIGNARD REAGENT WITH CARBON DIOXIDE:



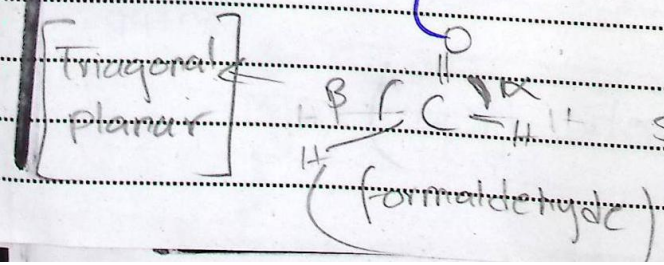
Q.NO 6

(5)

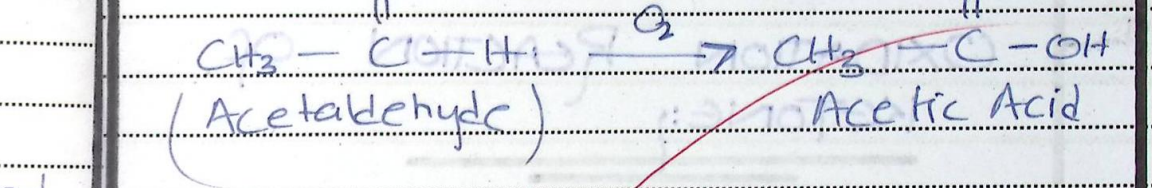
STRUCTURE OF ALDEHYDES:

Let us consider structure of formaldehyde. Here Carbon and oxygen are sp^2 hybridized. There is sigma and pi-bond between Carbon and oxygen atom. Carbon and oxygen bond length is short due to polarity and lone pair of electrons on oxygen atom. There is 120° and 108.5° angles. Shape is trigonal planar.

STRUCTURE:



OXIDATION REACTION OF ALDEHYDE:

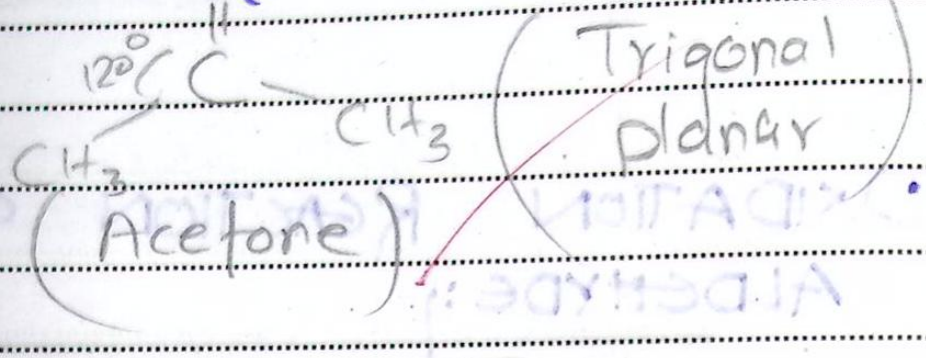


PCC are compounds which initiate oxidation reactions.

STRUCTURE OF KETONES:

Ketones have very similar structure to aldehydes. Here Carbonyl Carbon and oxygen are sp^2 hybridized. There is sigma and pi-bond between Carbon and Oxygen. Bond angles are almost 120°.

STRUCTURE:



OXIDATION REACTION OF KETONE:

Ketones do not undergo oxidation directly. There is no direct alpha hydrogen. Its oxidation can be done by various mechanism. One reaction is this: