SUBJECTIVE - TYPE

SECTION - B

QUESTION - 02

SHORT - ANSWERS

(i)

IONIZATION - ENERGY:

DEFINITION:

The minimum amount of energy required to remove the outermost electron from one mole of isolated gaseous atom to form one mole of monopositive ions is called

ionization energy.

Ionization energy of phosphorous is higher than Sulphur:

REASON:

Consider their electronic configuration:

$_{15}P$: $1s^2, 2s^2, 2p^6, 3s^2, 3P_x^1, 3P_y^1, 3P_z^1$

↑	↑	

half filled

$_{16}S$: $1s^2, 2s^2, 2p^6, 3s^2, 3P_x^2, 3P_y^1, 3P_z^1$

↑↓	1	1

Partially filled

The electrons present in the p-subshell of phosphorus (P) are said to be half-filled and more stable. while the electrons in the p-subshell of sulphur are said to be partially filled and less stable. The removal of electron from partially filled orbital re quire

less energy. Hence, less energy (ionization energy) is required to remove electron from sulphur (S).

(ii)

TYPICAL TRANSITION ELEMENTS:

DEFINITION:

The elements which have partially filled 'd' orbitals in their atomic states or in any of their common oxidation states and have characteristics properties are called typical transition elements.

EXAMPLE: Iron is a transition element & belong to group VIIIB.

NON-TYPICAL TRANSITION ELEMENTS:

DEFINITION:

The transition elements which have completely filled 'd' orbitals in their atomic or in any common oxidation states and do not have properties of typical transition elements are called non-typical transition elements.

EXAMPLE: Zinc is an example of non-typical transition elements

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(XII)

PHOTOCHEMICAL SMOG:

DEFINITION:

When smog is formed due to some photochemical reaction taking

place among various pollutants in the atmosphere then it is called photochemical smog.

FORMATION OF PHOTOCHEMICAL SMOG:

↳ Automobiles & industrial exhausts which contain nitrogen Oxide & unburned hydrocarbons They react with each other in the presence of sunlight form ozone which is the primary component in the formation of photochemical smog.

↳ Photochemical smog is characterized by an accumulation of brown hazy fumes over the horizon.

(X)

EFFECT OF PH ON ENZYME ACTIVITY:

Every enzyme work at maximum rate in the presence of proper PH. The PH at which the enzyme show effective work as known as optimum PH. If the PH of enzyme increase or decrease from its optimum PH, then enzyme's work is disturbed & stoped & it denatures.

Optimum PH of Pepsin:

The optimum PH of pepsin is '2'

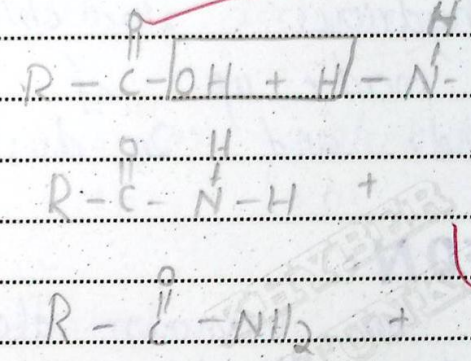
EFFECT OF TEMPERATURE ON ENZYME ACTIVITY:

INTRODUCTION:

- The rate of enzymatic activity increases with increase in temperature.
- The temperature at which enzyme work more effectively is known as optimum temperature.
- If the value of temperature increase of decreases from its optimum value then enzyme became denature.
- If the temperature increases by 10 °C, then enzyme activity becomes double.
- Optimum Temperature for enzymes of Human Body: is 37 °C.

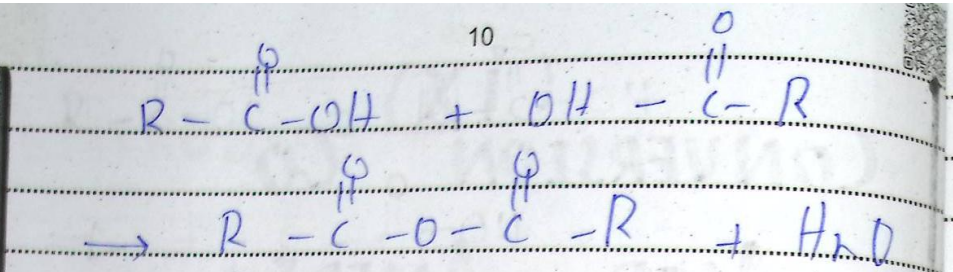
(IX) CONVERSION TO ACID AMIDE:

Carboxylic acid can be converted into acid amide by reacting it with ammonia (NH_3)



CONVERSION TO ACID ANHYDRIDE:

Carboxylic acid can be converted into acid anhydride by reacting it with another carboxylic Acid.



(Vii)

LUCUS TEST:

The anhydrious zinc chloride ($ZnCl_2$) made up of chloride and Zn dust

EXPLANATION:

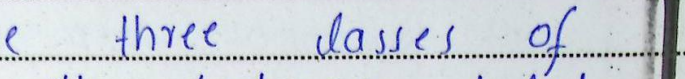
When an unknown alcohal is treated with "corresponding" lucus reagent. corresponding alkyl halide / chloride is formed. This is done in alcohal to differentiate among primary, secondary and tertiary alcohals.

BASED ON:

It is based on readivity.

of the three classes of alcohals with hydrogen halide via S_N1 reaction.

REACTION:



Primary alcohal reacts slowly with locus reagent.

Secondary alcohal reacts moderatly with locus reagent.

Tertial alcohal reacts very fastly with locus reagent.

(Xiii)

APPLICATION OF IR SPECTROSCOPY.

SORRY

see next Page

Following are some of the important application of IR spectroscopy.

1- IDENTIFICATION OF FUNCTIONAL GROUP:

Infra red spectroscopy gives information about presence of different functional groups in a molecule.

2- IDENTIFICATION OF COMPOUND:

This technique is used to identify compound by comparing its finger print region in IR-spectrum with that unknown compound.

3- DETECTION OF IMPURITIES:

The presence of apsorbption peak at position where

where the compound does not indicate the presence of impurities.

4 **PROGRESS OF REACTION:**

The progress of reaction can be identified from IR spectrum.

(Xi)

FOUR USES OF PVC:

four uses of poly vinyl chlorides are given below.

REXINES:

PVE plastics is manipulated to create a leather-like material called rexine.

PIPES:

PVC are used for pipes. These pipes are strong, light weight and

low reactive.

BOTTLES:

PVC plastic is used to manufacture bottles.

INSULATION OF WIRES:

PVC plastic is used to form the insulating material on electrical wires and cables.

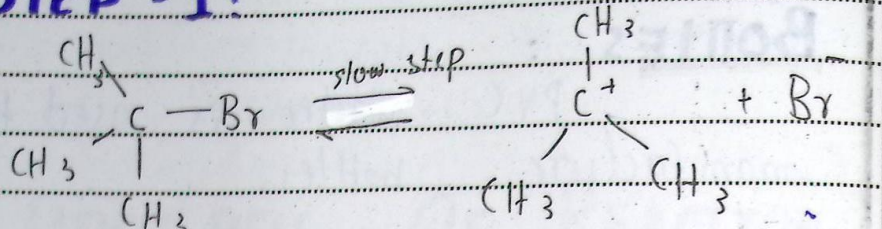
(Vi)

SN1 MECHAINISM:

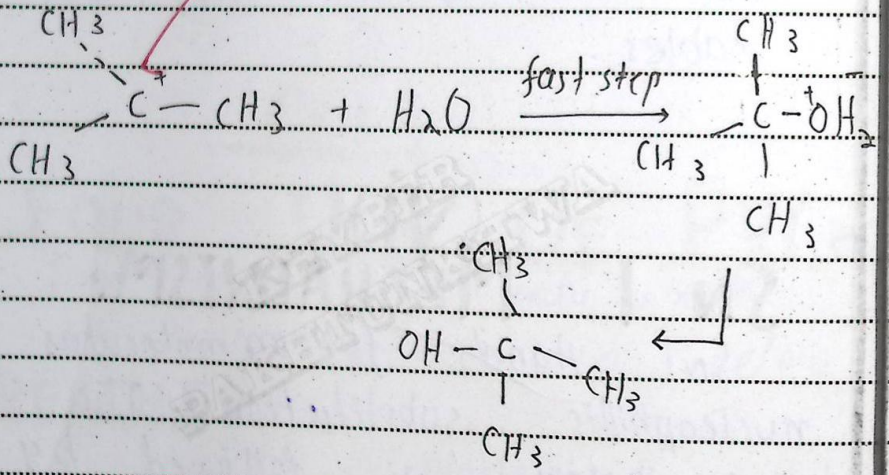
SN1 stands for unimolecular nucleophillic substitution. This mechainsim is followed by tertiary alkyl alkyl halide.

$$(CH_3)_3\ C-Br + H_2O \longrightarrow (CH_3)_3C-H + HBr$$

STEP - 1:



STEP - 2:



TERTIARY ALKYL HALIDE:

The alkyl halide in which halogen atom is directly attached to tertiary carbon atom are called tertiary alkyl halide.

(V) NECESSARY & SUFFICIENT CONDITIONS:

1- **PRESENCE OF DOUBLE BOND.**
Usually seen in alkenes (C=C) where rotation around the bond is restricted.

2- **DIFFERENT GROUP ON EACH CARBON OF DOUBLE BOND.**
Each carbon of double bond must have two different groups attached to it.

3- **RESTRICTED ROTATION.**
The π- bond in double bond restrics rotation & allowing for fixed spatial positions.

4- **CAN ALSO OCCUR IN CYCLIC COMPOUNDS:**
In cycloalkanes, restricted rotation also causes geometric isomers.

SECTION- C

LONG ANSWERS

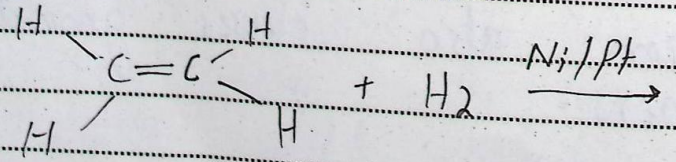
QUESTION- 4

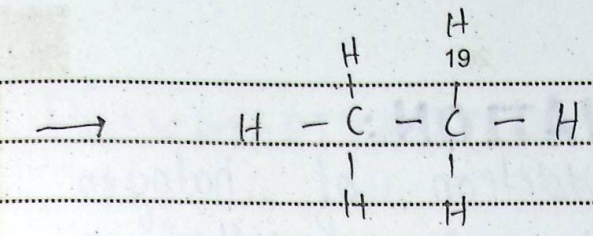
CHEMICAL REACTIONS OF ALKENES:

Alkenes undergoes addition reactions.

HYDROGENATION:

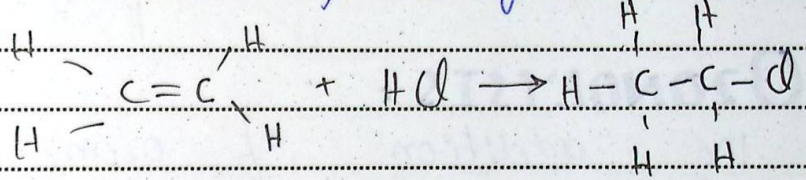
Addition of hydrogen to alkenes in the presence of catalyst Ni / pt. at the temperature of 150°C - 300°C





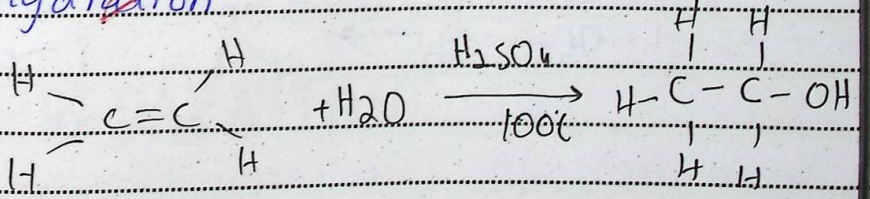
HYDROHALOGENATION:

The addition of hydrogen halide to alkene is called hydrohalogenation.



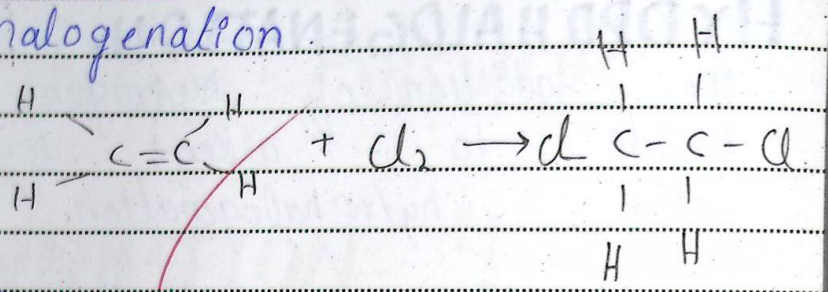
HYDRATION:

The addition of water to alkene in the presence of H_2SO_4 is called hydration.



HALOGENATION:

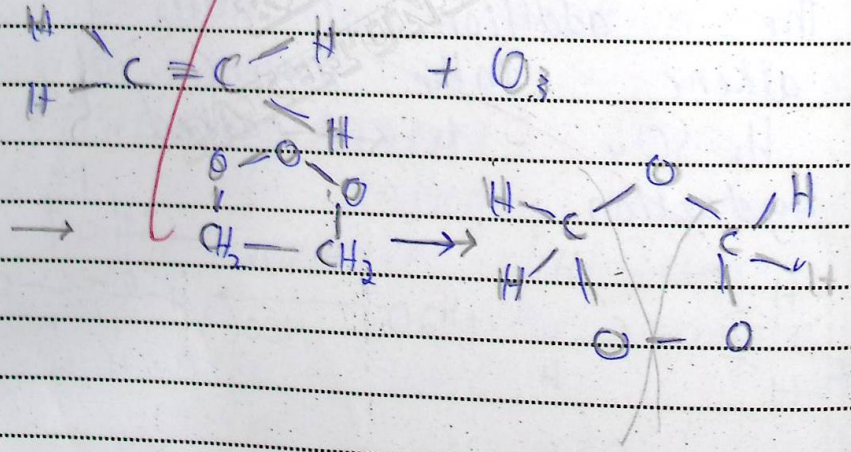
The addition of halogen to alkene is called halogenation.



OZONOLYSIS:

The addition of ozone (O_3) to the alkene is called ozonolysis

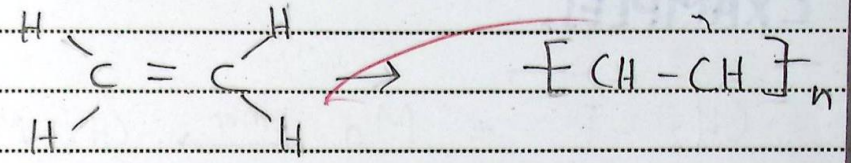
$CH_2 = CH_2 + O_3$



POLYMERIZATION:

It is the reaction in which small monomers join togather to form a polymer.

EXAMPLE: polyethene



QUESTION - 05

GRIGNAR'S REAGENT:

The reagent composed of alkyl group & magnesium along with aldehyde.

PREPARATION:

Preparation of Grignard's reagent is give below:

GENERAL REACTION:

$$R-X + Mg \xrightarrow{Ether} R-MgX$$

EXAMPLES.

$$CH_3-I + Mg \xrightarrow{Ether} CH_3-Mg-I$$

REACTIONS OF GRIGNARD REAGENT WITH ALDEHYDE:

Grignard's reagent reacts with aldehyde to give addition products.

$$CH_3-MgI + H-\overset{O}{\overset{\|}{C}}-H \rightarrow H-\underset{CH_3}{\overset{OMgI}{\underset{|}{\overset{|}{C}}}}-H$$

$$H-\underset{CH_3}{\overset{OMgI}{\underset{|}{\overset{|}{C}}}}-H + H-OH \rightarrow H-\underset{CH_3}{\overset{OH}{\underset{|}{\overset{|}{C}}}}-H + Mg\begin{matrix}-I\\-OH\end{matrix}$$

REACTION WITH KETONE:

$$CH_3-MgI + CH_3-\overset{O}{\overset{\|}{C}}-CH_3 \rightarrow CH_3-\underset{CH_3}{\overset{OMgI}{\underset{|}{\overset{|}{C}}}}-CH_3$$

$$CH_3-\underset{CH_3}{\overset{OMgI}{\underset{|}{\overset{|}{C}}}}-CH_3 + H-OH \xrightarrow{H^+} CH_3-\underset{CH_3}{\overset{OH}{\underset{|}{\overset{|}{C}}}}-CH_3 + Mg\begin{matrix}-I\\-OH\end{matrix}$$

REACTION WITH CO_2:

$$CH_3-MgBr + O=C=O \rightarrow O=\underset{OMgBr}{\overset{CH_3}{\underset{|}{\overset{|}{C}}}}$$

$$CH_3-\overset{O}{\overset{\|}{C}}-OMgBr + H-OH \xrightarrow{H^+} CH_3-\overset{O}{\overset{\|}{C}}-OH + Mg\begin{matrix}-Br\\-OH\end{matrix}$$

(7) Reaction complete

QUESTION - 6

STRUCTURE OF ALDEHYDE & KETONE:

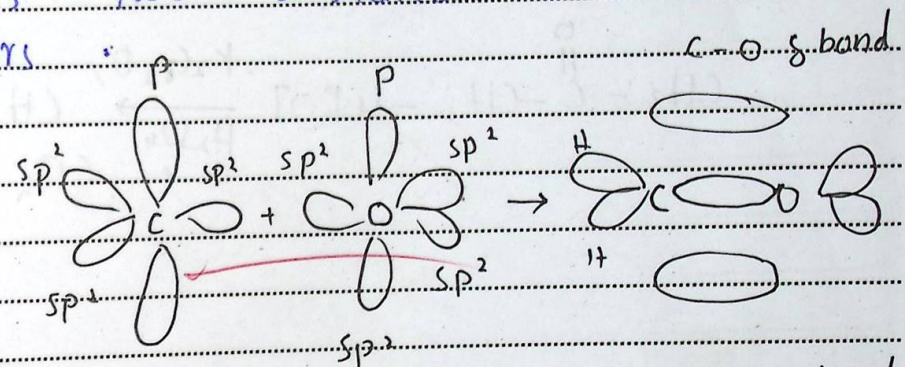
Let us consider formaldehyde as example of carbonyl compounds to illustrate its structure.

The carbon & oxygen present in carbonyl group, present in aldehyde & ketones are linked by a sigma bond and a pi bond.

Both carbon as well as oxygen are sp^2- hybridized

Two of the sp^2 -hybrid orbitals of oxygen has

two unshared electron pairs while two of the sp^2- hybrid orbits of oxygen has two unshared electron pairs.



The carbon oxygen bond length is 120 pm.

The bond angle is approximately 120°

OXIDATION OF ALDEHYDE

$$CH_3-\overset{\overset{O}{\|}}{C}-H + [O] \xrightarrow[KMnO_3]{H_2SO_4} CH_3-\overset{\overset{O}{\|}}{C}-OH$$

OXIDATION OF KETONE:

$$CH_3-\overset{\overset{O}{\|}}{C}-CH_3 + 4[O] \xrightarrow[H_2SO_4]{K_2Cr_2O_7} CH_3-\overset{\overset{O}{\|}}{C}-OH + CO_2 + H_2O$$