

Notes for

11th Recap

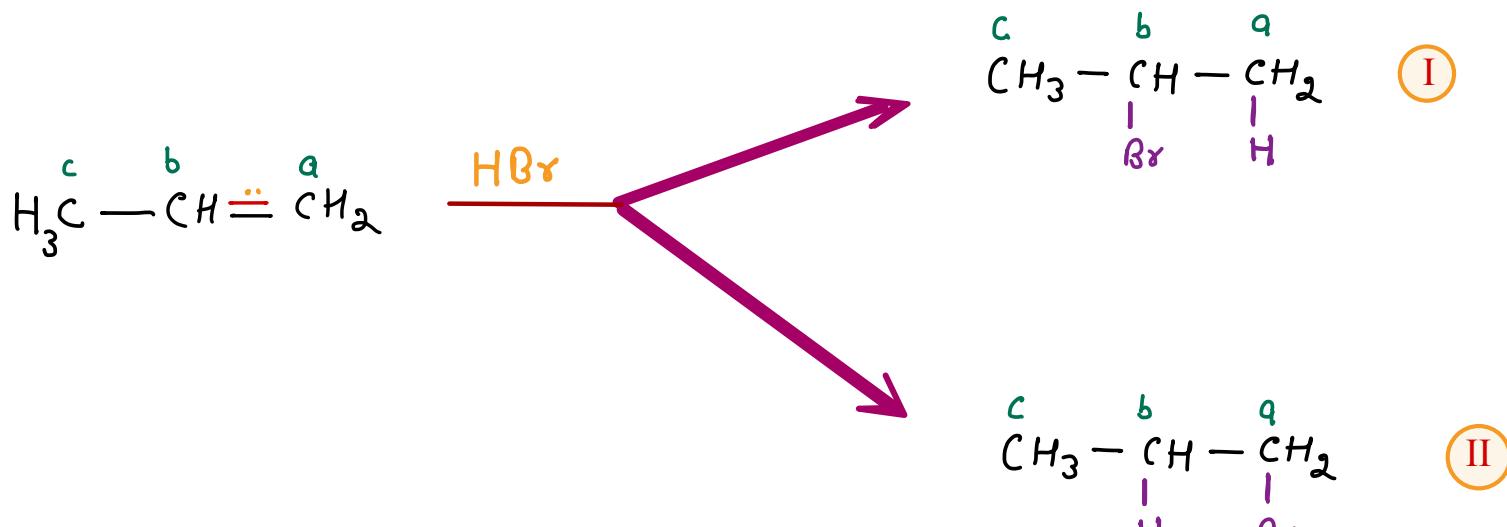
Organic Chemistry



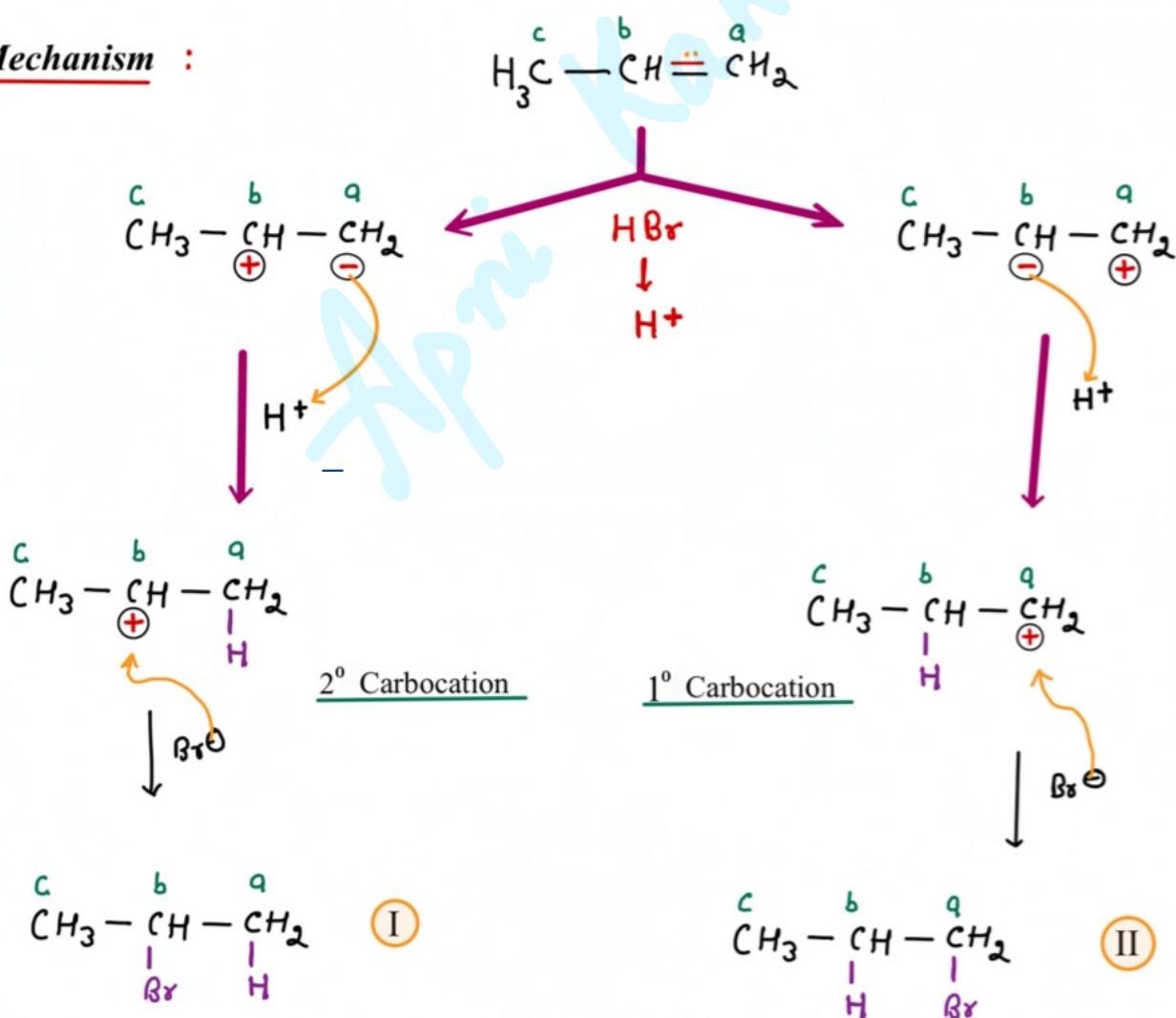
Hydrocarbons + IUPAC

Hydrocarbons

Hydro-halogenation



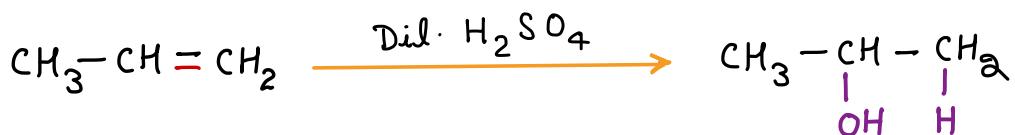
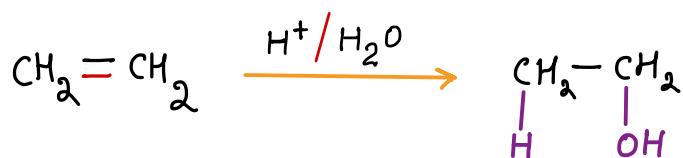
Mechanism :



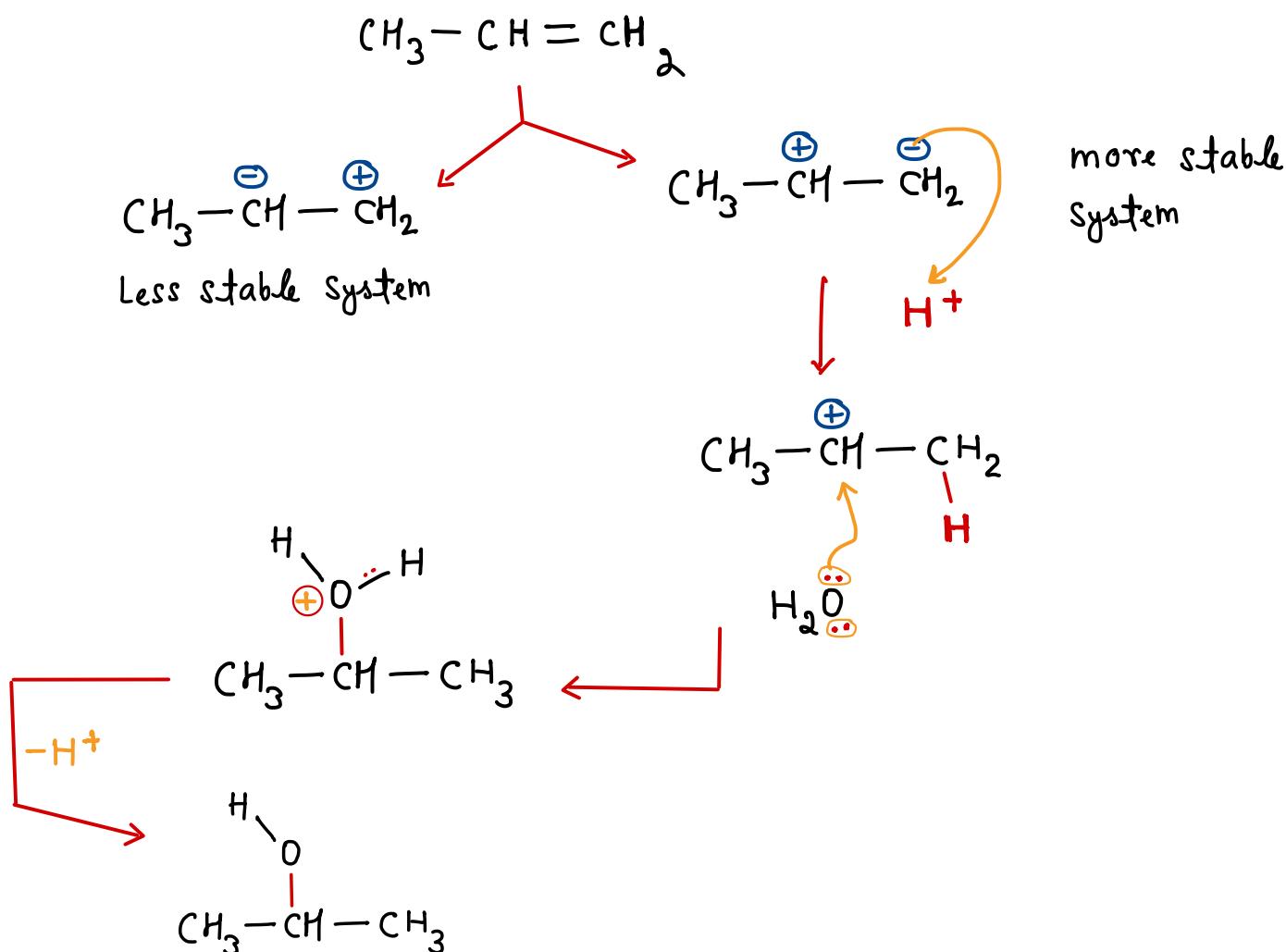
Hydration : Addition of water :-

Reagents :
 — H⁺ / H₂O
 — H₃O⁺
 — Dil. H₂SO₄

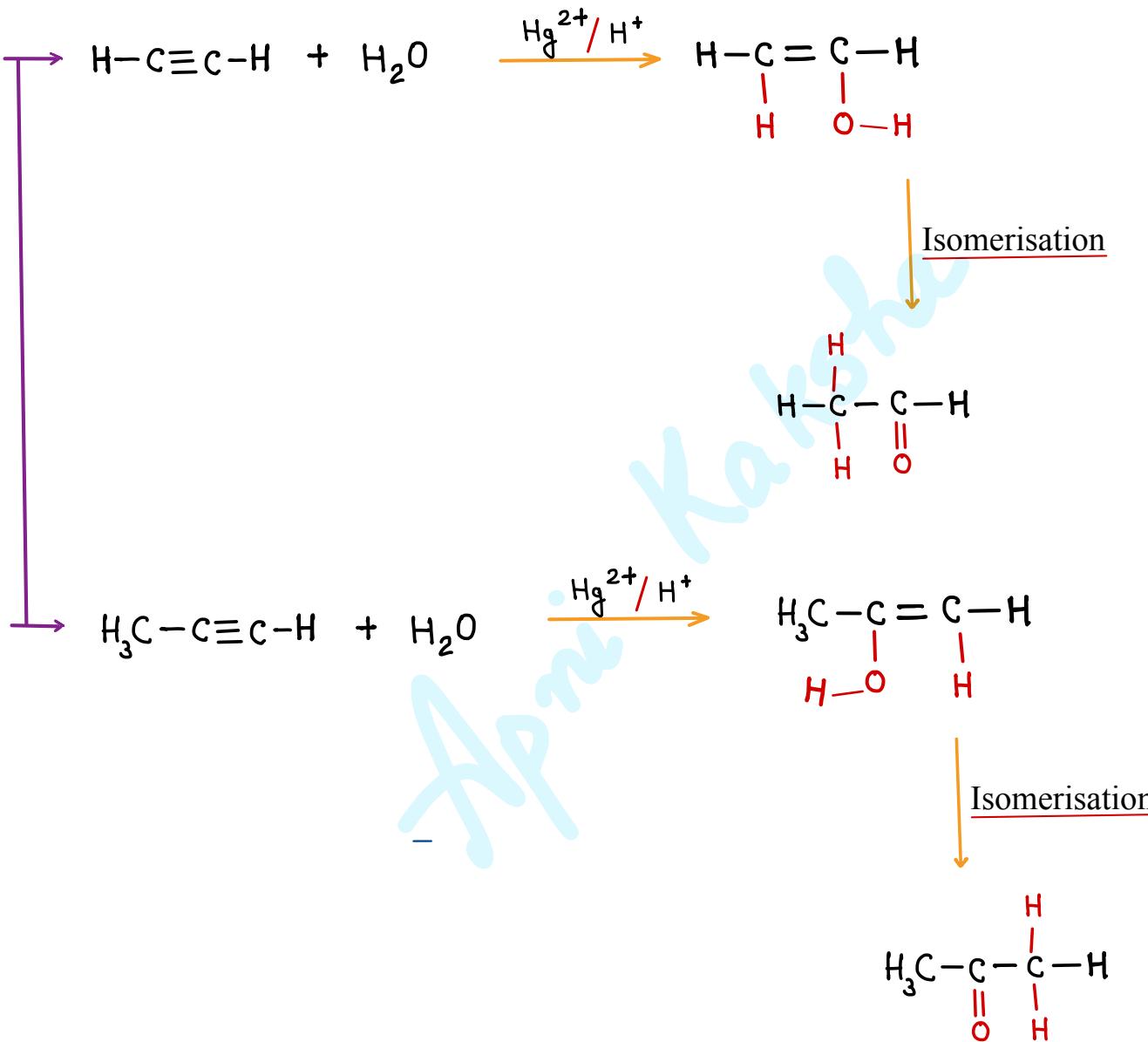
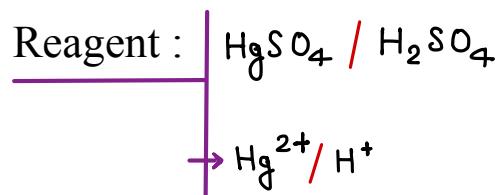
(i) Alkene :



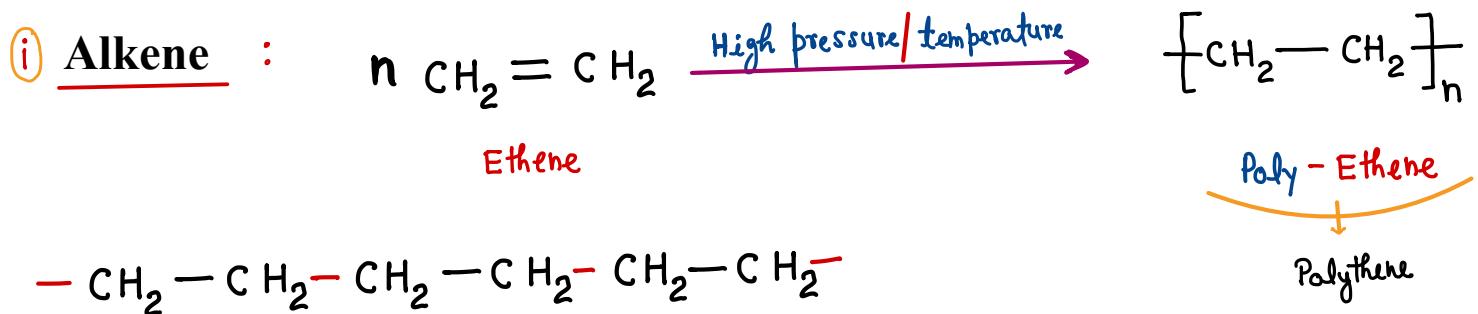
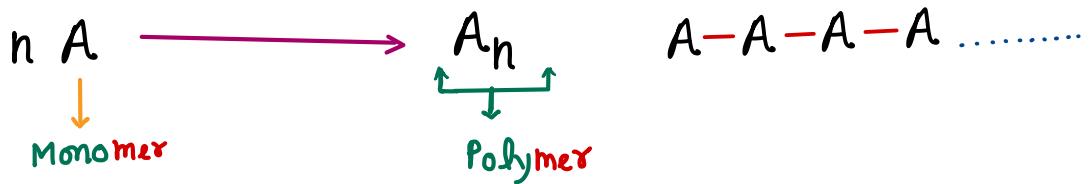
Mechanism :



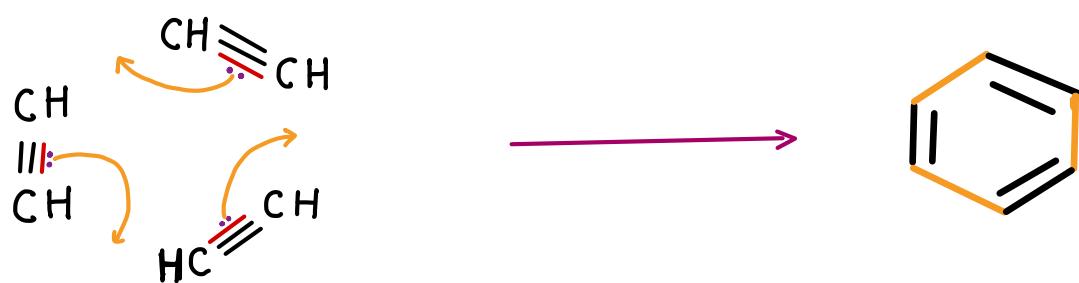
ii

Alkyne :

Polymerisation :



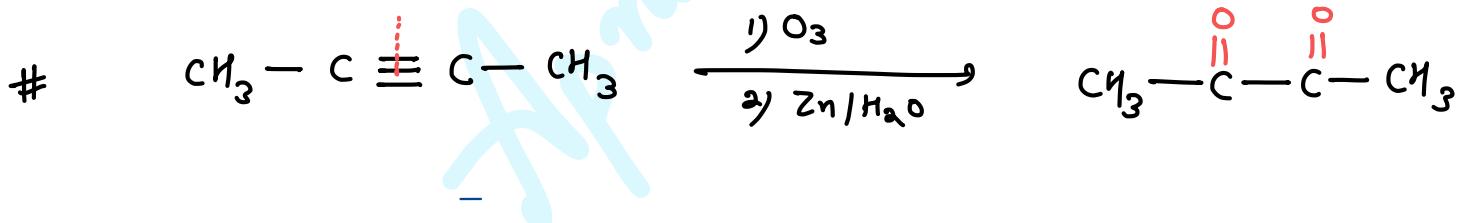
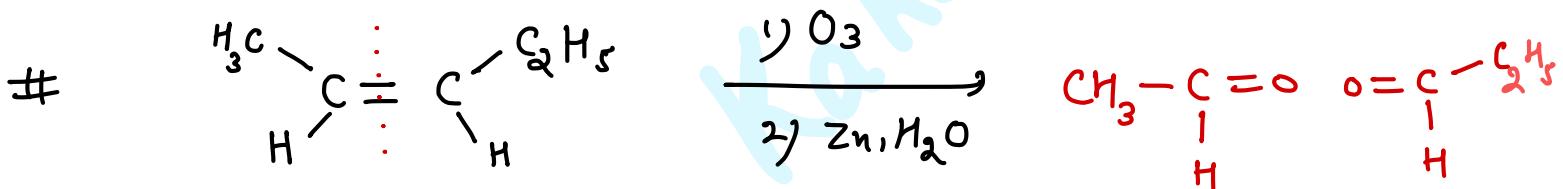
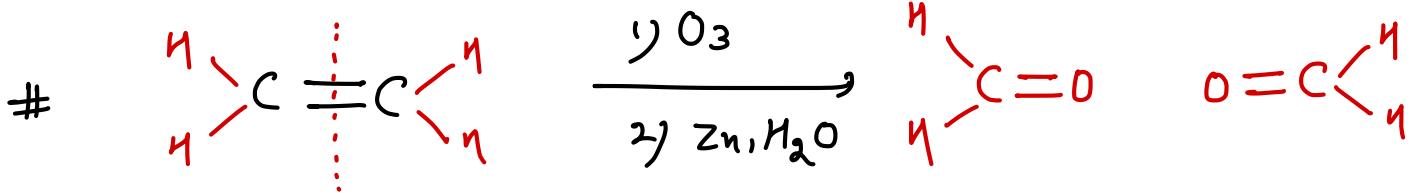
ii) Alkyne :



Ozonolysis :-

Ozone Breaking

Breaking in presence of O_3



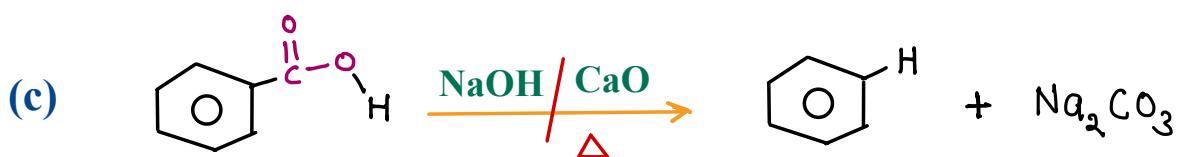
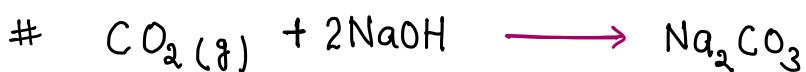
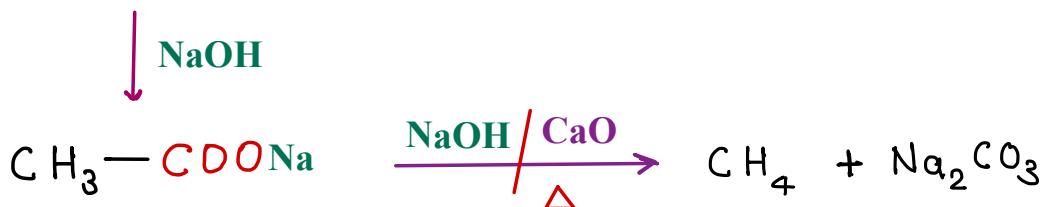
Decarboxylation :

Removal of CO_2

Process of elimination of carbon dioxide from a carboxylic acid is known as **decarboxylation**.

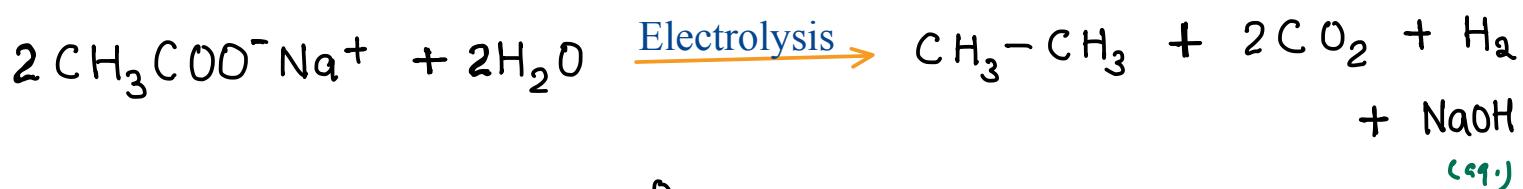
(i)

Soda-lime decarboxylation :

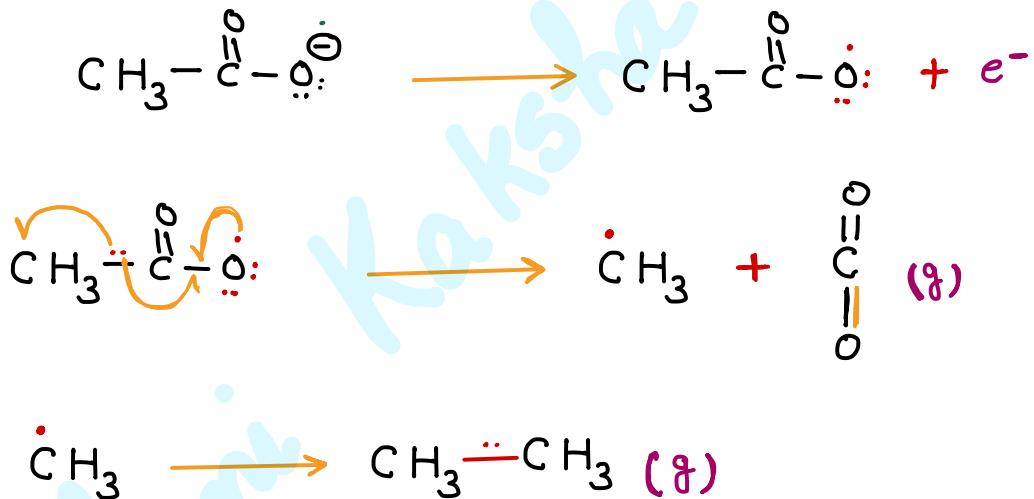


ii

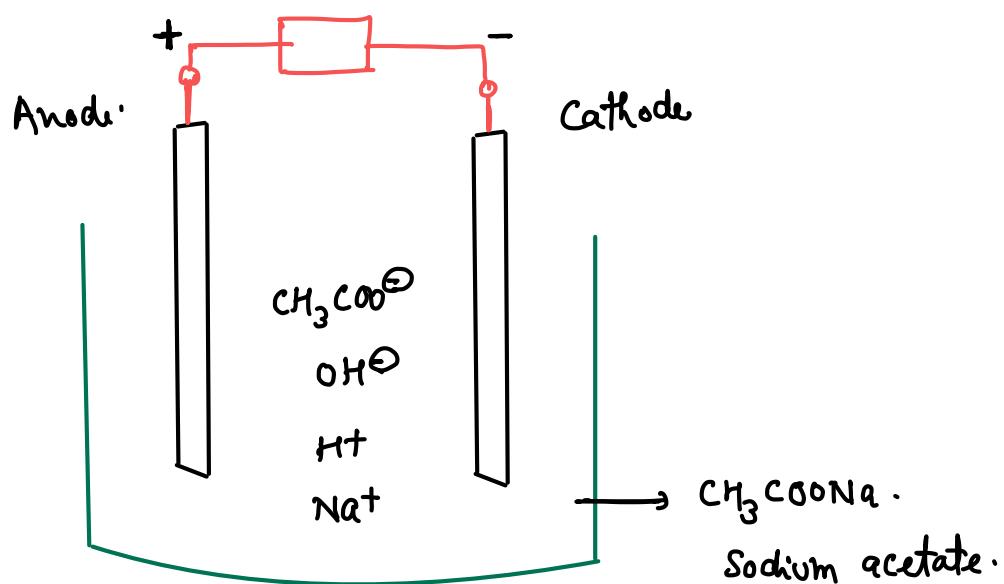
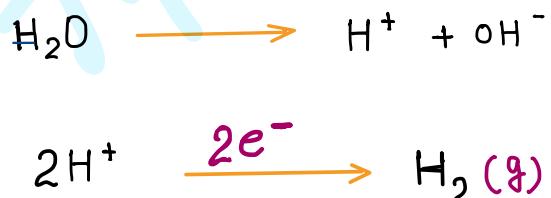
Kolbe Electrolysis :-



(i) Anode
↓
Oxidation



(ii) Cathode
↓
Reduction



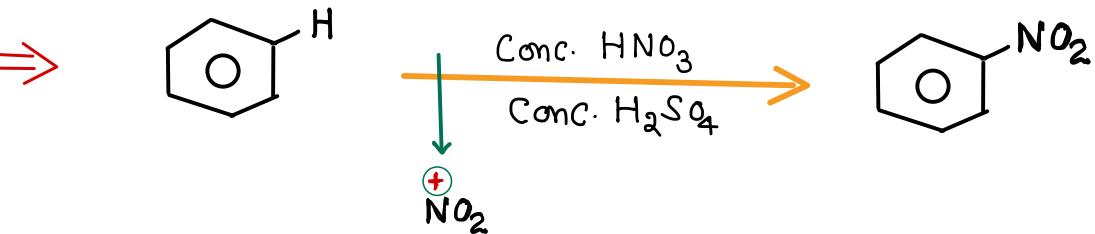
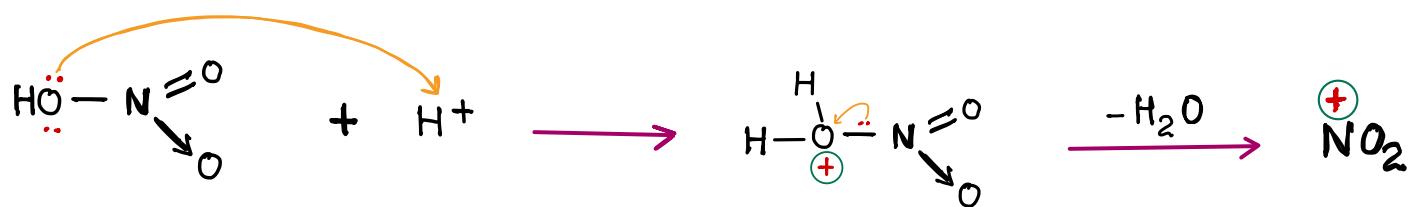
Electrophilic Substitution Reactions :



i) Nitration :-

Reagent : Conc. HNO_3 + Conc. H_2SO_4

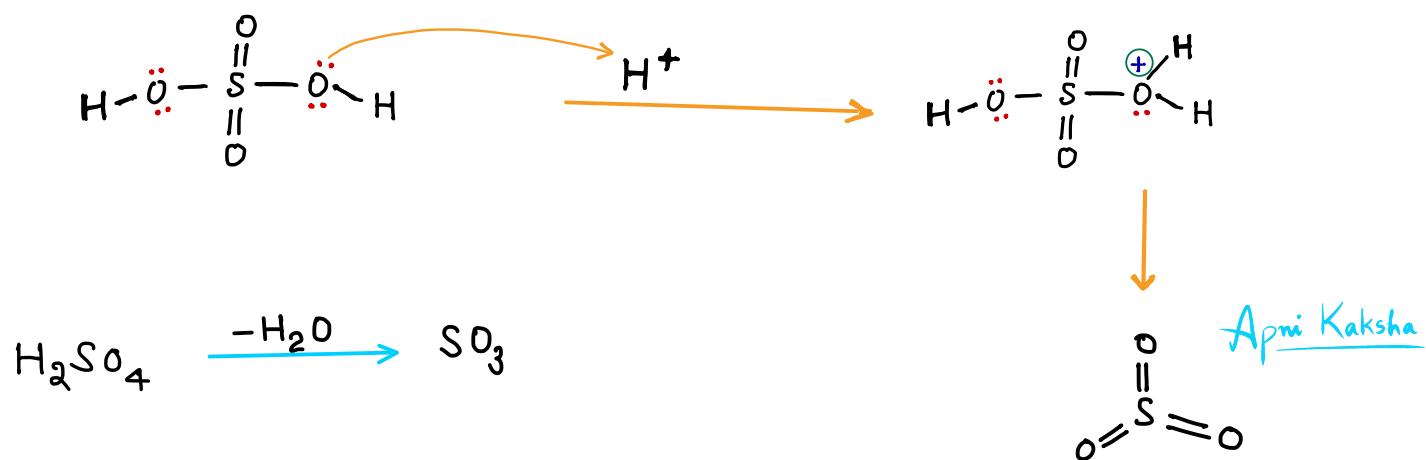
Formation of electrophile :

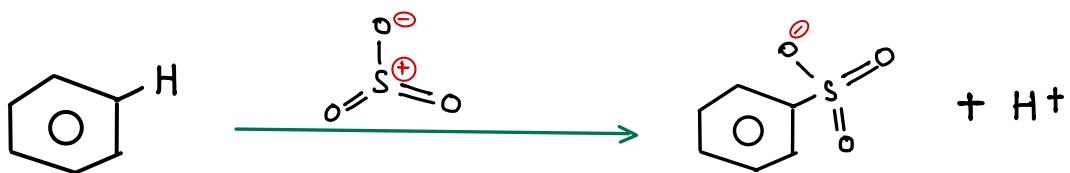
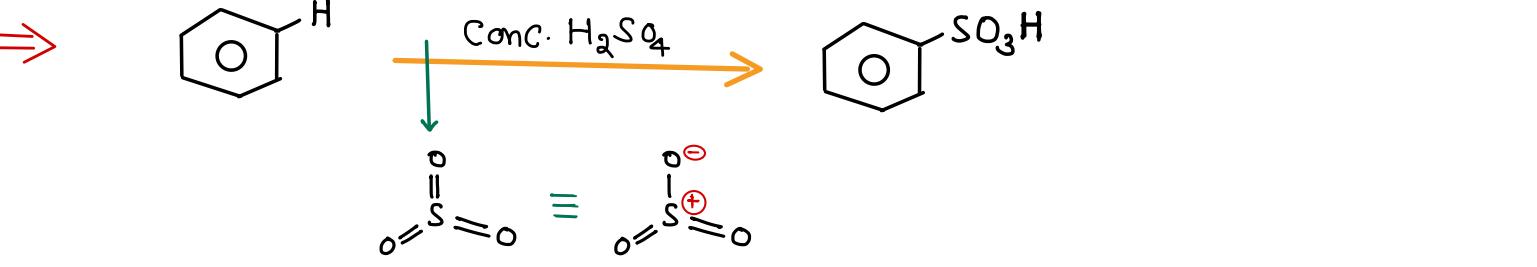


ii) Sulphonation :

Reagent : Conc. H_2SO_4

Formation of electrophile :



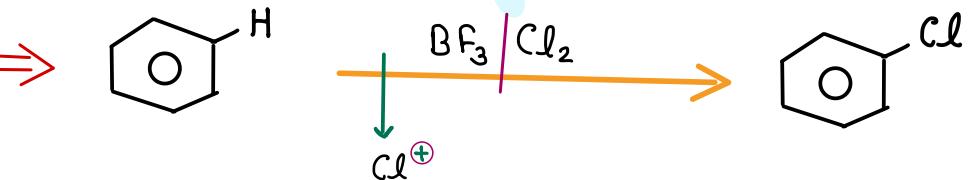


iii Halogenation :

Reagent : Lewis Acid + X_2



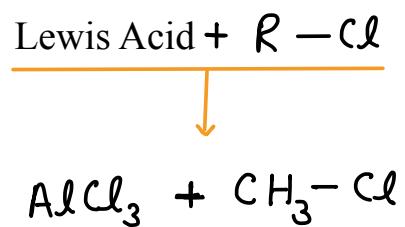
Formation of electrophile :



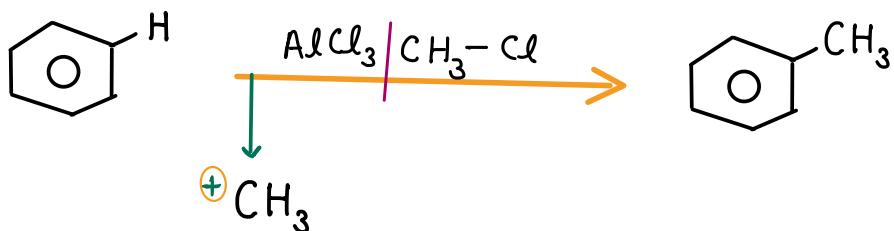
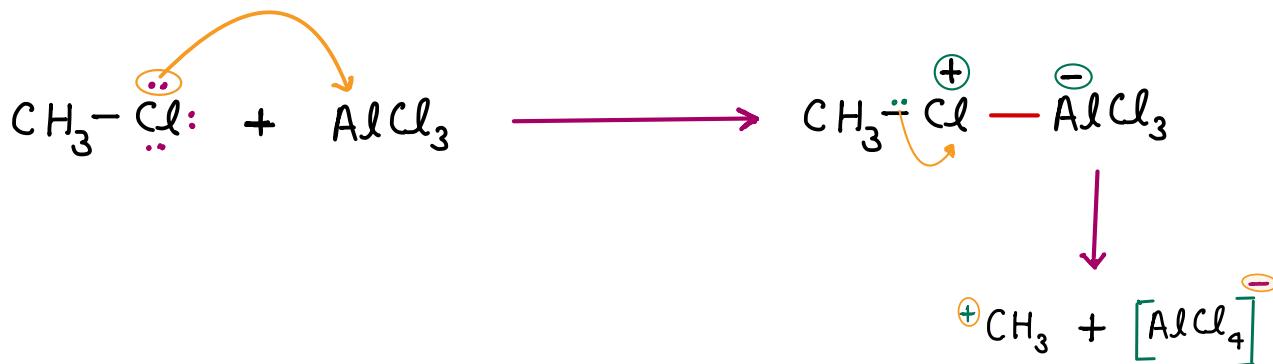
Friedel Craft Reaction :

→ Friedel Craft Alkylation :
 Addition of alkyl group.

Reagent :



Formation of electrophile :

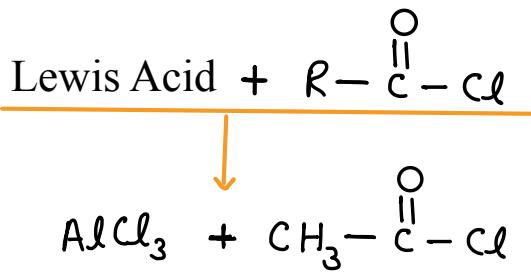


ii

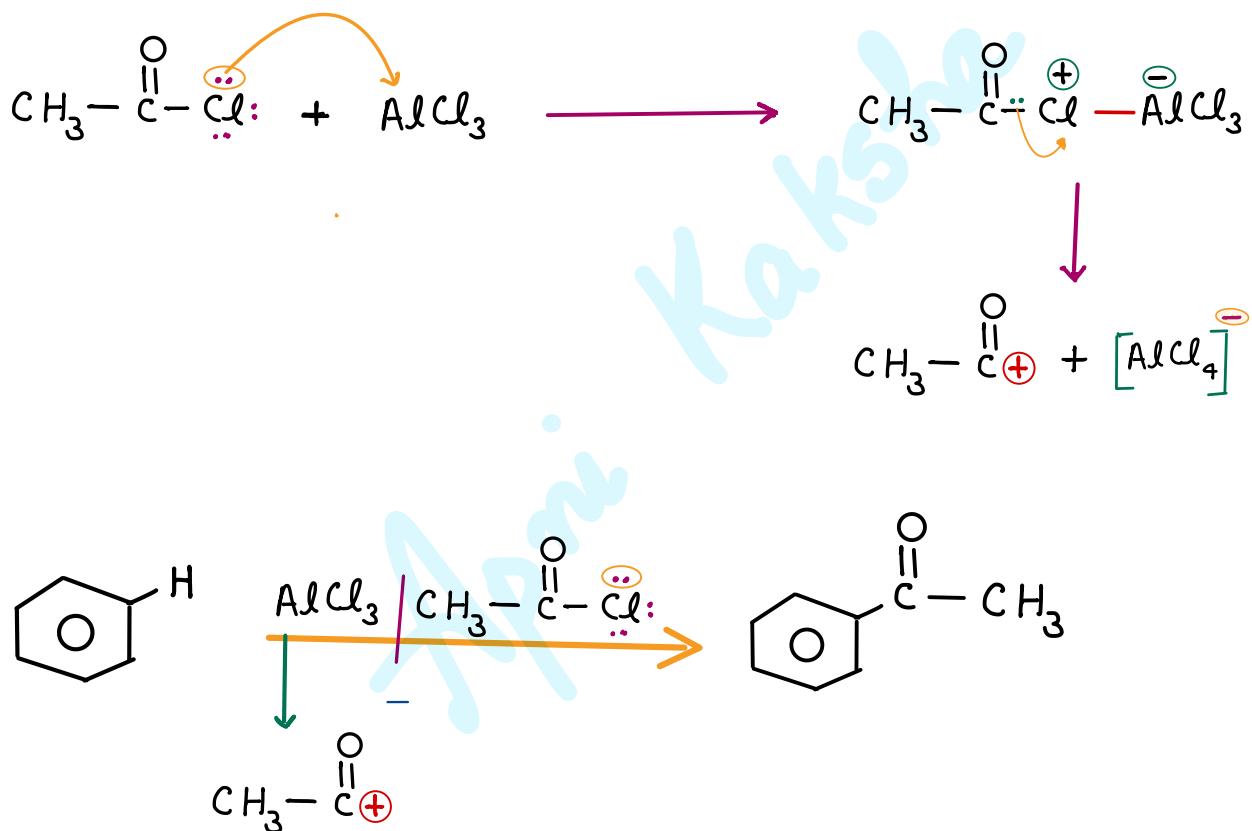
Friedel Craft Acylation :

Addition of acyl group

Reagent :



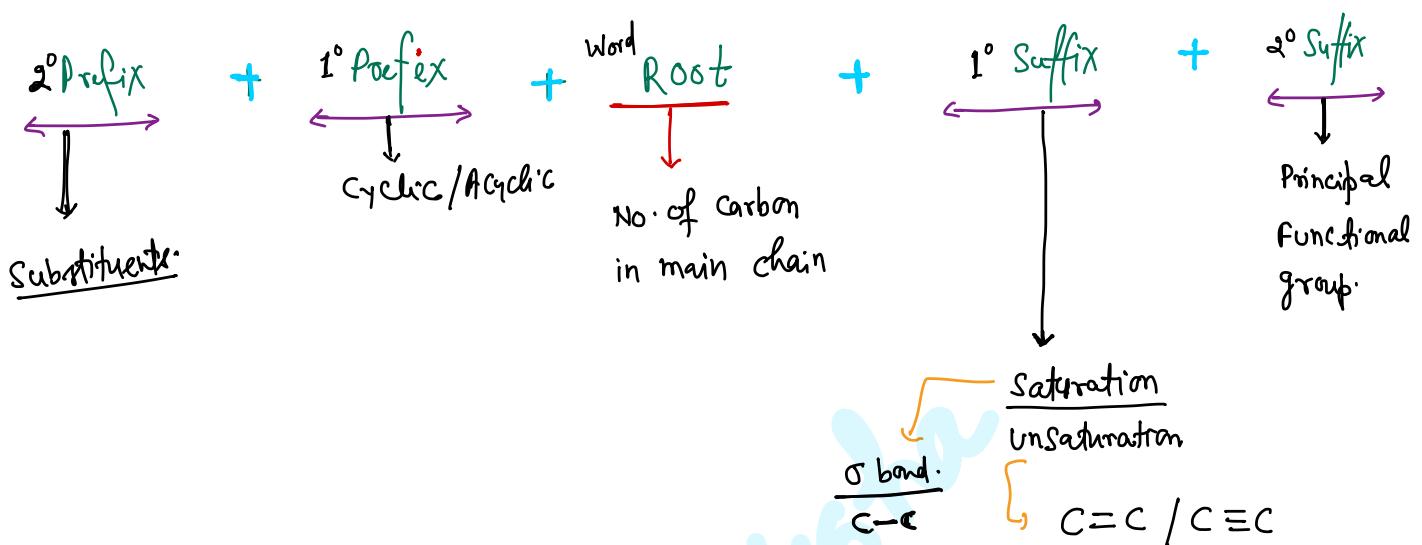
Formation of electrophile :



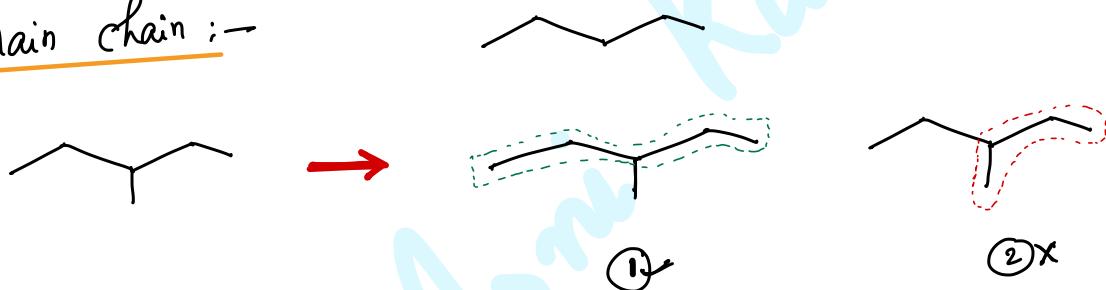
IUPAC

Apni Kaksha

IUPAC



Main chain :-



No. of Carbon	Word Root
1	Meth
2	Eth
3	Prop
4	But
5	Pent
6	Hex
7	Hept

8	\rightarrow	Oct
9	\rightarrow	Non
10	\rightarrow	Dec

Primary Suffix :-

① Single bond -: alke
 $\boxed{[C-C]}$

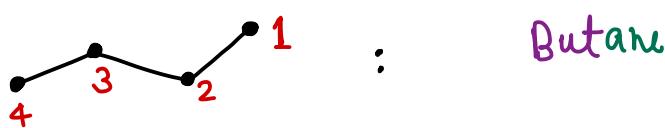
② Double bond -: ene
 $\boxed{[C=C]}$

③ Triple bond -: yne
 $\boxed{[C\equiv C]}$

④ One double bond + One triple bond -: enyne
 $\boxed{[C=C]}$ $\boxed{[C\equiv C]}$

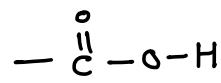
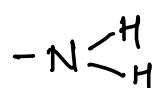
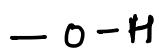
Two double bond -: diene
 $\boxed{[C=C]} + \boxed{[C=C]}$

Two triple bond -: dyne
 $\boxed{[C\equiv C]} \quad \boxed{[C\equiv C]}$



Secondary Suffix :-

Functional Groups :- Group of atom which decides the chemical and physical properties of a organic molecule.

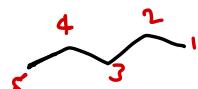


1^o Prefix :-

Cyclic or Acyclic

↓
Cyclo

↓
X



:-

Pentane

: Acyclic



:-

Cyclopentane

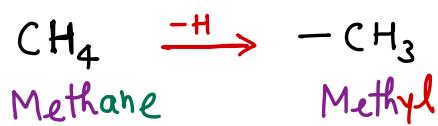
: Cyclic.

2^o Prefix :-

Substituent

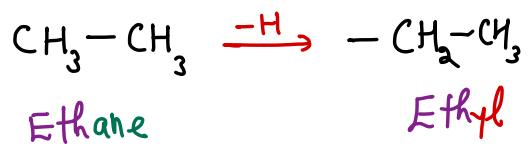
①

Alkyl group (-R)



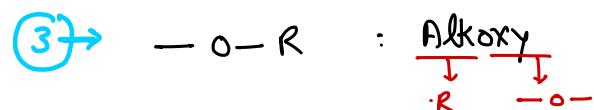
②

-X : halo



-Cl : chloro

-Br : bromo



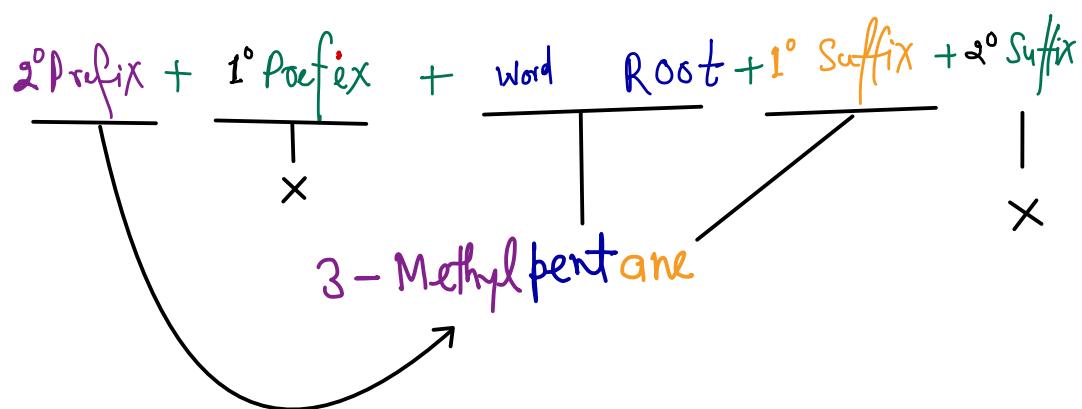
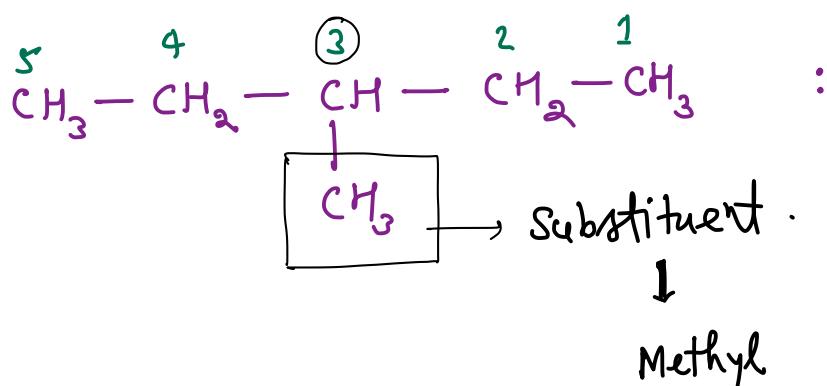
-O-CH₃ : Methoxy

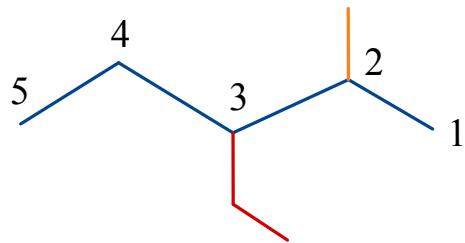
-O-C₂H₅ : Ethoxy.

Naming of saturated hydrocarbon [Alkanes]

Selection of main chain and numbering :-

- No. of carbon > No. of substituent > Lowest set of locants
> Alphabetical order.



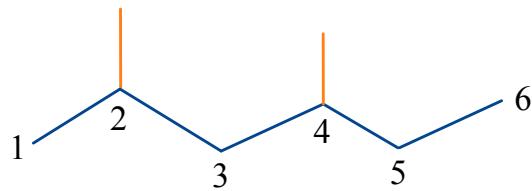


3-Ethyl-2-methylpentane

Set of locants

(i) [2,3]

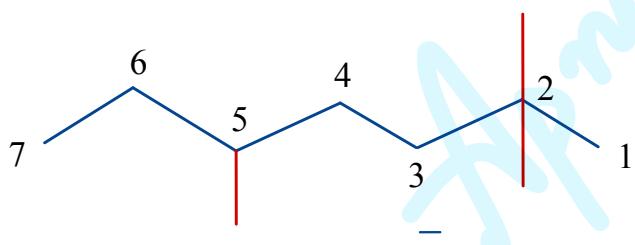
(ii) [3,4]



2,4-Dimethylhexane

(i) [2,4]

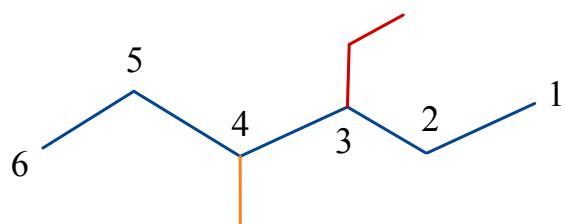
(ii) [3,5]



2,2,5-Trimethylheptane

(i) [2,2,5]

(ii) [3,6,6]



3-Ethyl-4-methylhexane

(i) [3,4]

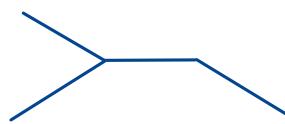
(ii) [3,4]

Question : Write down the structure of :

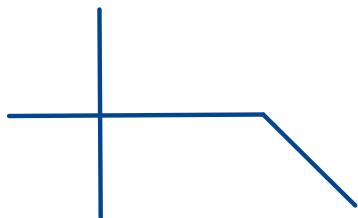
- Isopentane
- Neohexane
- tert. Pentyl
- n-propyl
- sec-propyl

Answer :

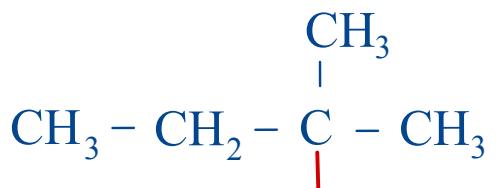
Isopentane



Neohexane



tert. Pentyl



n-propyl



sec-propyl



Question : Write the structure of the following compounds.

n-Propylbromide

Isopropylchloride

Isobutylchloride

Answer : n-Propylbromide \longrightarrow $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{Br}$

Isopropylchloride \longrightarrow $\text{CH}_3 - \underset{\substack{| \\ \text{Cl}}}{\text{CH}} - \text{CH}_3$

Isobutylchloride \longrightarrow $\text{CH}_3 - \underset{\substack{| \\ \text{CH}_3}}{\text{CH}} - \text{CH}_2 - \text{Cl}$

Question : Write the structure of 1-chloro-2,2-dimethylpropane.

Answer : $\begin{array}{c} -\text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH}_2 - \text{Cl} \\ | \\ \text{CH}_3 \end{array}$

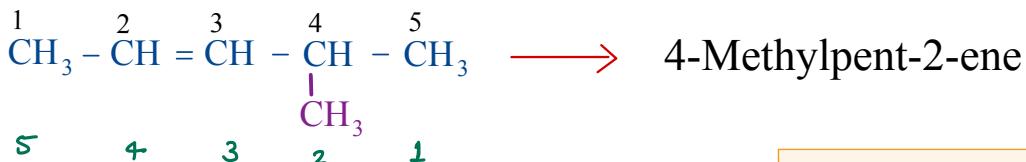
Naming of Unsaturated Compounds

Rules for selection of main chain and numbering :

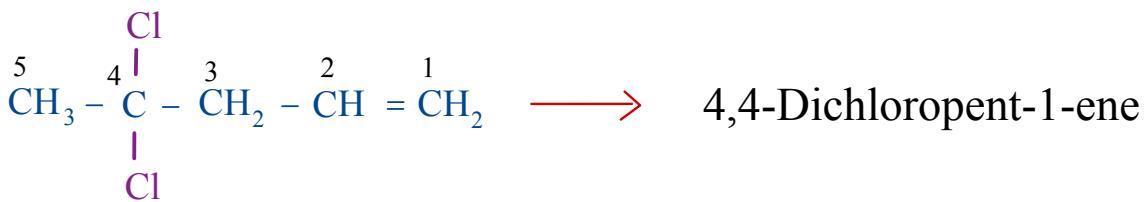
Maximum number of Carbon with M.B. > Number of sub. > Lowest set of locants

> Alphabetical Order .

Multiple Bond
minimum possible no.



Multiple Bond > Substituent



Double bond > Triple bond



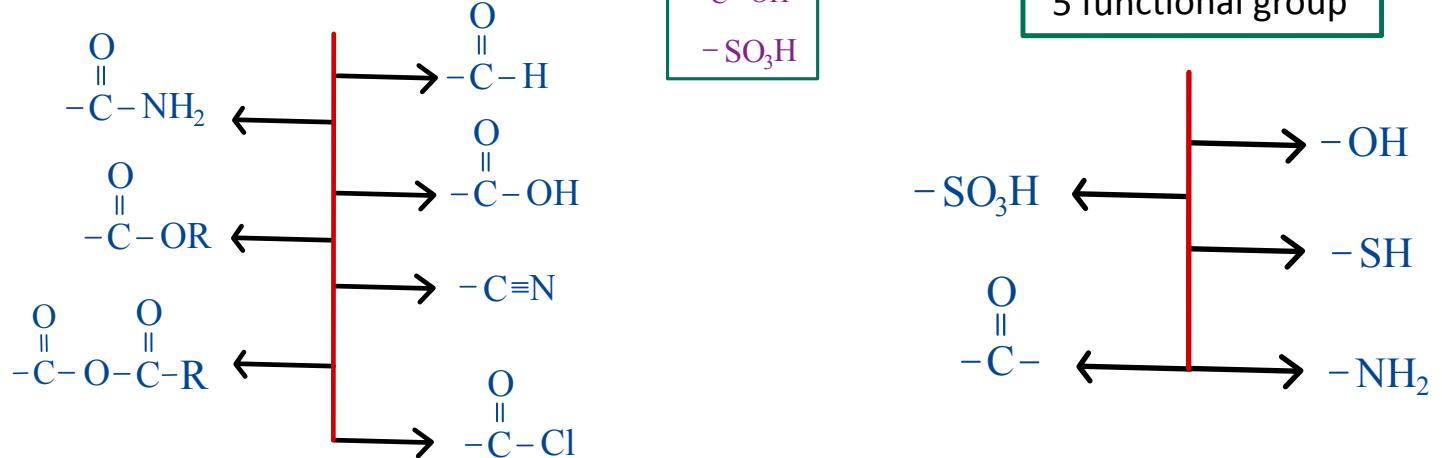
Naming Of Functional Groups



12 Functional Groups

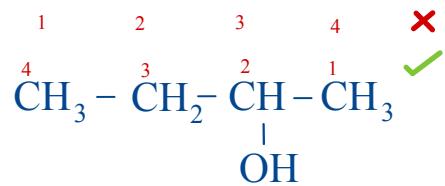
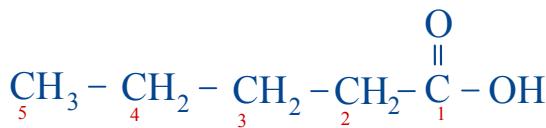
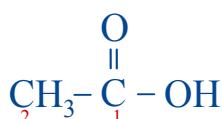


Functional Groups



Rule: If above 7 functional groups are present in carbon chain, it is always given the position 1.

Rule: Numbering is done from the side of the chain which gives the lowest number to functional group



Selection of main chain/numbering :-

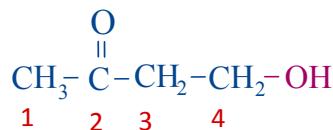
→ Functional group > Multiple Bonds > No. of carbon atoms > No. of substituents > lowest locant > alphabetical order

Note : If first alphabet of the suffix is a / e / i / o / u then e of primary suffix will be dropped.

Lowest locant :-

[Functional group > Multiple Bonds > Substituents]

→ The senior most functional group makes the suffix while other junior functional group are written as prefix in alphabetical order.

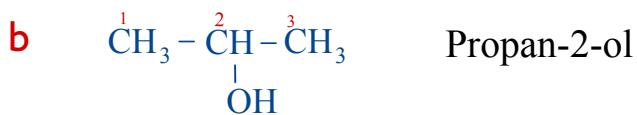


4-Hydroxybutan-2-one

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Alcohols

Functional Groups	Suffix	Prefix
-OH	ol	hydroxy



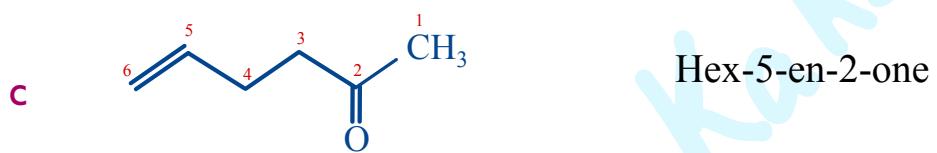
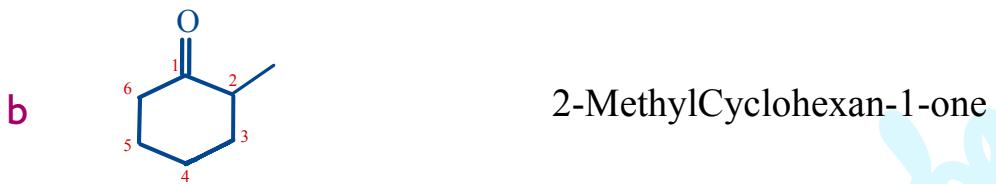
Amines

Functional Groups	Suffix	Prefix
$-\text{NH}_2$	Amine	Amino



Ketones

Functional Groups	Suffix	Prefix
$R-C(=O)-R$	one	oxo



Carboxylic Acid

Functional Groups	Suffix	Prefix
$-\text{C}(=\text{O})\text{OH}$	<i>oic acid</i>	-



Methanioc acid



Butane-1,4-dioic acid



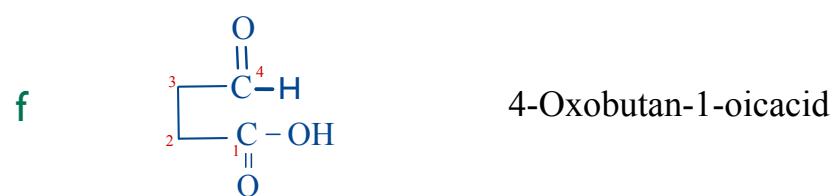
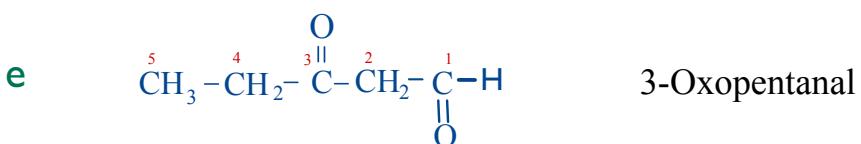
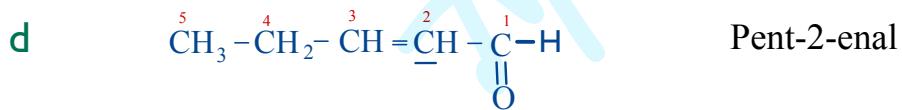
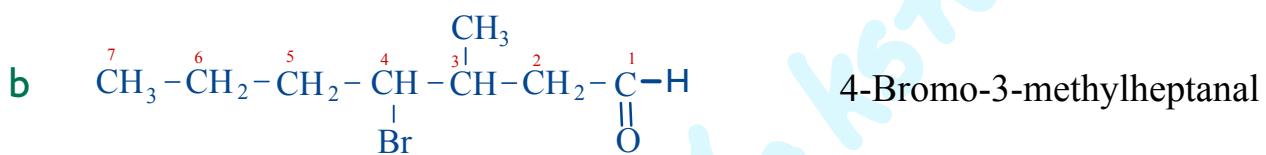
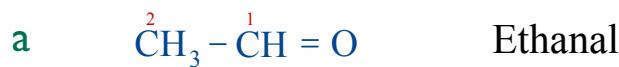
2-Phenylethanoic acid



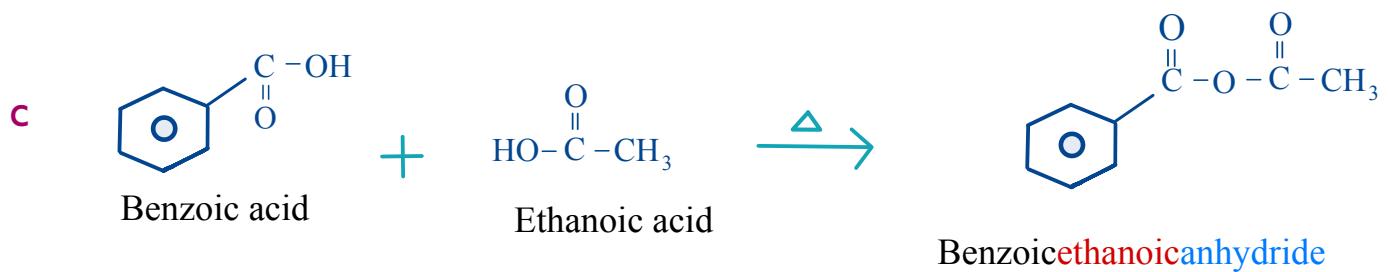
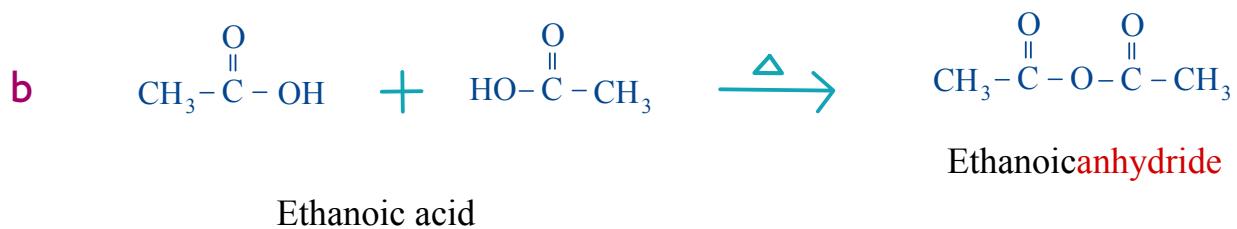
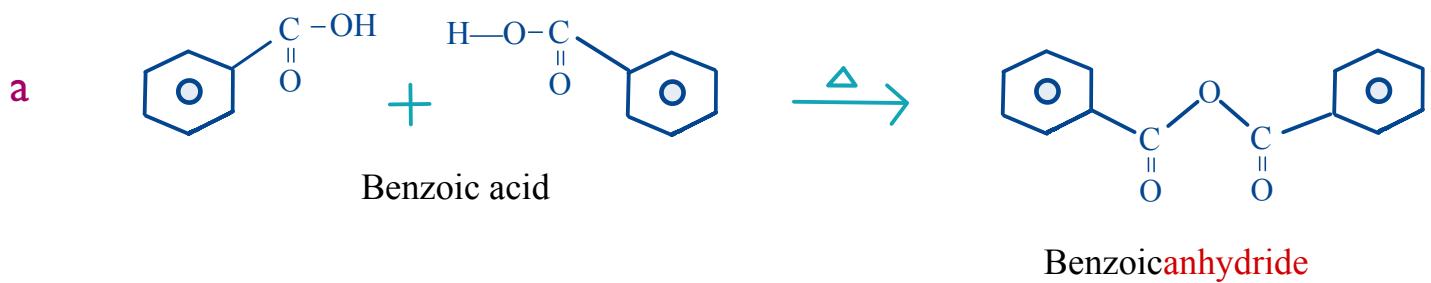
2-Cyclohexylethanoic acid

Aldehydes & Ketones

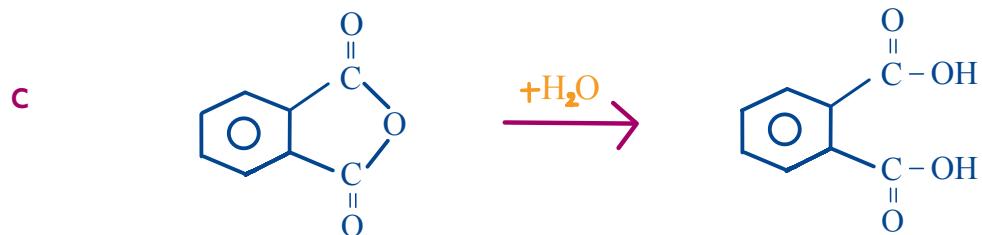
Functional Groups	Suffix	Prefix
—C=H	al	Oxo
—C=R	one	Oxo



Acid Anhydride



Note

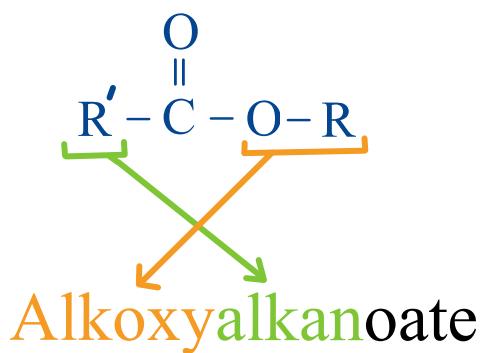


Benzene-1,2-dicarboxylic anhydride

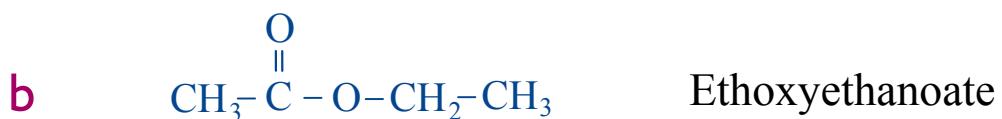
Benzene-1,2-dicarboxylic acid

Apni Kaksha

Ester

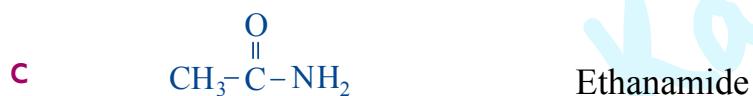


Suffix : oate



Amides

Functional Groups	Suffix	Prefix
$\text{C}=\text{O}-\text{NH}_2$	amide or Carboxamide	-



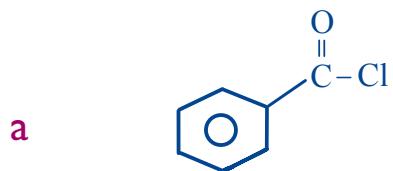
Nitrile

Functional Groups	Suffix	Prefix
$\text{C}\equiv\text{N}$	nitrile or Carbonitrile	-



Acid Halide

Functional Groups	Suffix	Prefix
$-\text{C}=\text{O}-\text{X}$	Oyl halide or Carbonyl halide	-

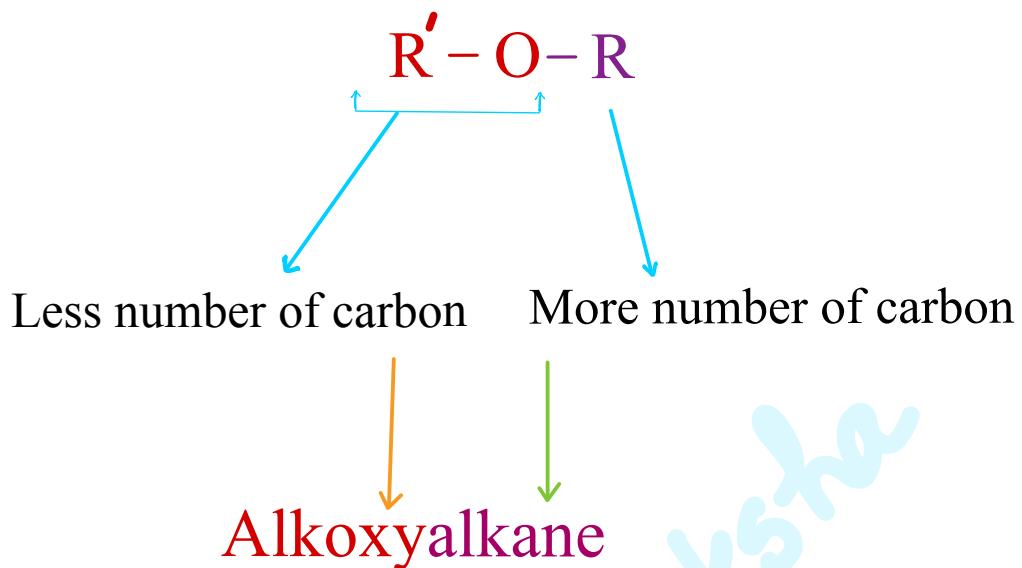


Benzene**carbonylchloride**



Ethan**oylchloride**

Ether



a



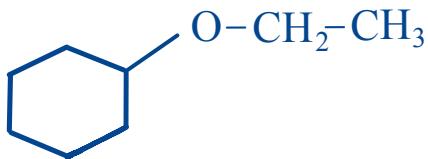
Methoxymethane

b



Methoxyethane

c



Ethoxycyclohexane