Types of Reactions:

Organic compounds mainly undergo 4 types of reactions

1) Addition reactions
2) Substitution reactions
3) Elimination reactions
4) Rearrangement reactions

Addition reactions: Unsaturated compounds containing double bonds or triple bonds will undergo addition.

In addition reaction, one pi bond is converted into 2 sigma bonds or 2 pi bonds are converted into 4 sigma bonds.

These addition reactions are of 3 types.

1) **Electrophilic addition :** Alkenes and alkynes undergo electrophilic addition reactions.

   Ex: $CH_2 = CH_2 + HCl \rightarrow CH_3 - CH_2 - Cl$

   Electrophilie is H^+

2. Nucleophilic addition : Aldehydes and ketones will undergo nucleophilic addition.

Ex : $CH_3 - \overset{\delta+}{C} = \overset{\delta-}{O} + \overset{\delta+}{H} - \overset{\delta-}{CN} \rightarrow CH_3 - \underset{\underset{OH}{|}}{CH} - CN$ (H on C)

Nucleophilie is CN^-

3. Free radical addition: Anti Markonikov's addition of alkenes will involve addition of free radicals.

Substitution Reactions: It involves replacement of an atom or group in a molecule by a different atom or group.

Saturated compounds undergo substitution reactions. These substitutions are of 3 types.

1) Electrophilic substitution : It involves replacement of H by an electrophile.

Benzene and other aromatic compounds undergo electrophilic substitution.

Ex : $C_6H_6 + Cl_2 \xrightarrow{AlCl_3} C_6H_5Cl + HCl$

Electrophile is Cl^+.

2) Nucleophilc substitution : Alkyl halides undergo nucleophilic substitution reactions.

Ex : $C_2H_5 - Br + KOH \rightarrow C_2H_5 - OH + KBr$

Nucleophile in the above reaction is OH^-

Elimination reactions: These reactions involve loss of atoms or groups from adjacent carbons.

In elimination reactions, two sigma bonds will convert into one □ bond.

Alkyl halides undergo dehydrohalogenation

Alcohols will undergo dehydration.

Sodium or potassium salts of fatty acids will undergo decarboxylation reactions.

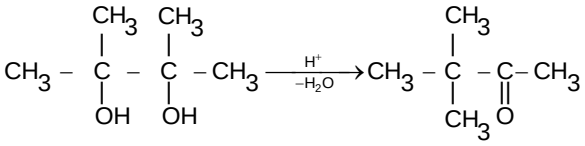
i) $CH_3–CH_2–Cl + KOH \rightarrow CH_2=CH_2+KCl + H_2O$

ii) $CH_3 – CH_2–OH \xrightarrow{con.H_2SO_4} CH_2=CH_2+H_2O$

iii) $CH_3-COONa + NaOH \xrightarrow[\Delta]{CaO} CH_4 + Na_2CO_3$

Rearrangement Reactions: These reactions involve migration of an atom or group from one carbon to another carbon in a molecule.

Pinacole–Pinacolone rearrangment : It involves shifting of CH_3 group. It also involves dehydration .



(pinacole) (pinacolone)