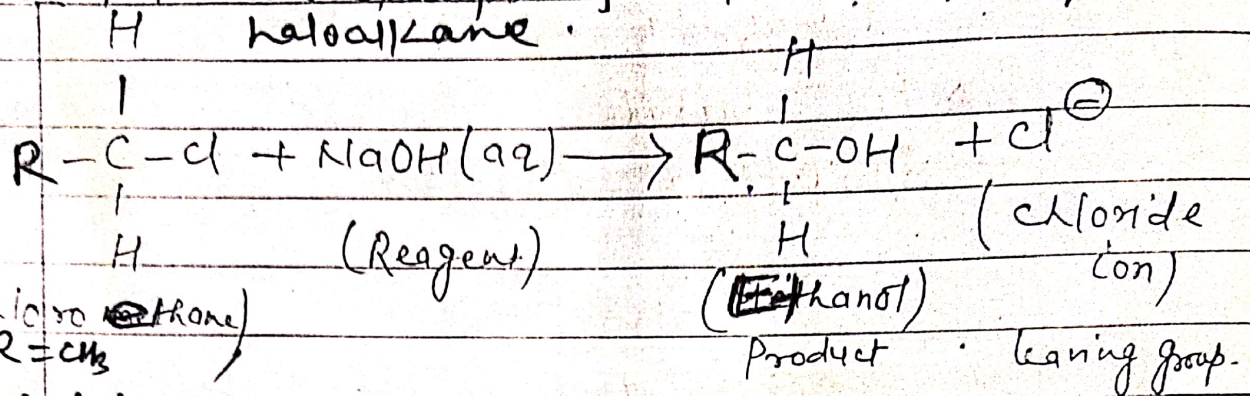


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# Reaction Mechanism

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Date: / /

Let us take an example of alkaline hydrolysis of



The participants of above reaction may be named as: -

**Substrate:** →

The organic molecule on which chemical change is being brought about is called substrate. e.g. in the above reaction chloroethane is the substrate.

**Reagent:** →

The substance or moiety by which chemical change on the substrate molecule is being brought about is called reagent. e.g. in the above reaction NaOH(aq) is the reagent.

**Product:** →

The new compound obtained by the ~~union~~ <sup>reaction</sup> of substrate and reagent is called product. e.g. in the above reaction ethanol is the product.

**Leaving group:** →

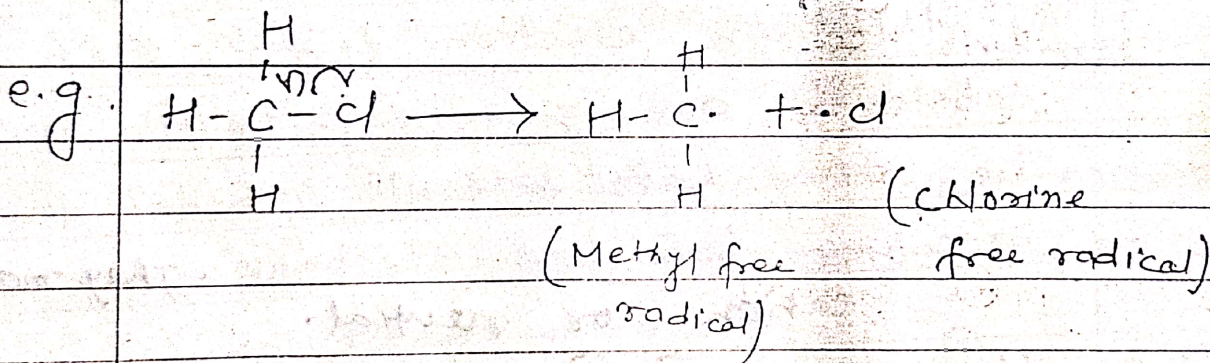
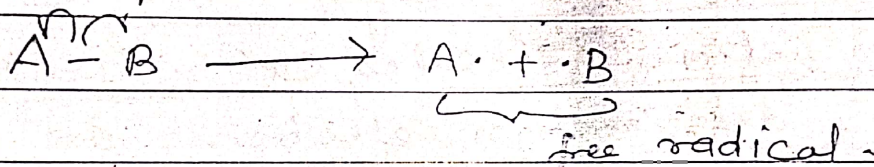
The atom or group of atoms which departs from the substrate molecule is called leaving group. e.g. in the above reaction Cl<sup>-</sup> is the leaving group.

# Modes of Cleavage of Substrate

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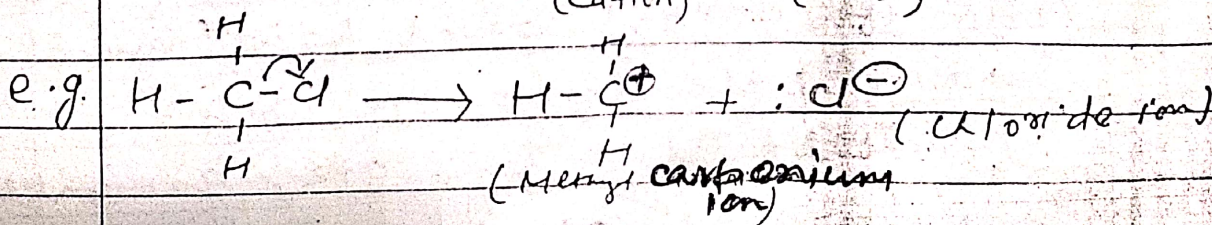
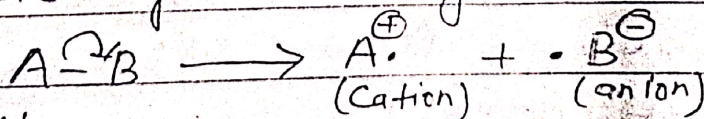
## (i) Homolytic cleavage: $\rightarrow$

When a covalent bond breaks in such a way that each of its partner separates with its electron, then it is called Homolytic cleavage or Homolysis and the resulting fragments are called free radicals. It takes place at high temp. or photochemically. ~~the~~ <sup>such</sup> breaking of a covalent bond is shown by fish like arrow.



## (ii) Heterolytic cleavage: $\rightarrow$

When a covalent bond breaks in such a way that one of the partner separates with both the shared electrons, then ions are formed and it is known as Heterolytic cleavage or Heterolysis.

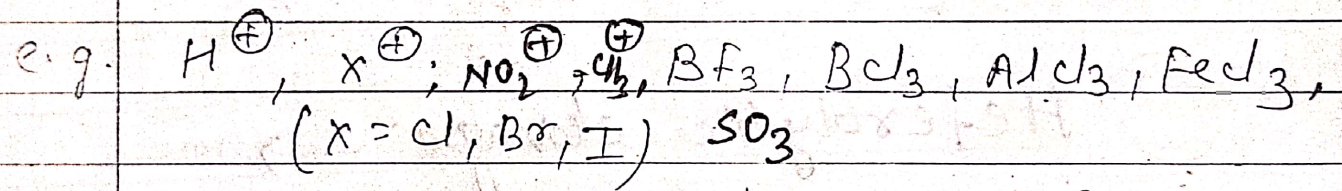


The element having high electronegativity separates as anion.

### Types of Reagent! →

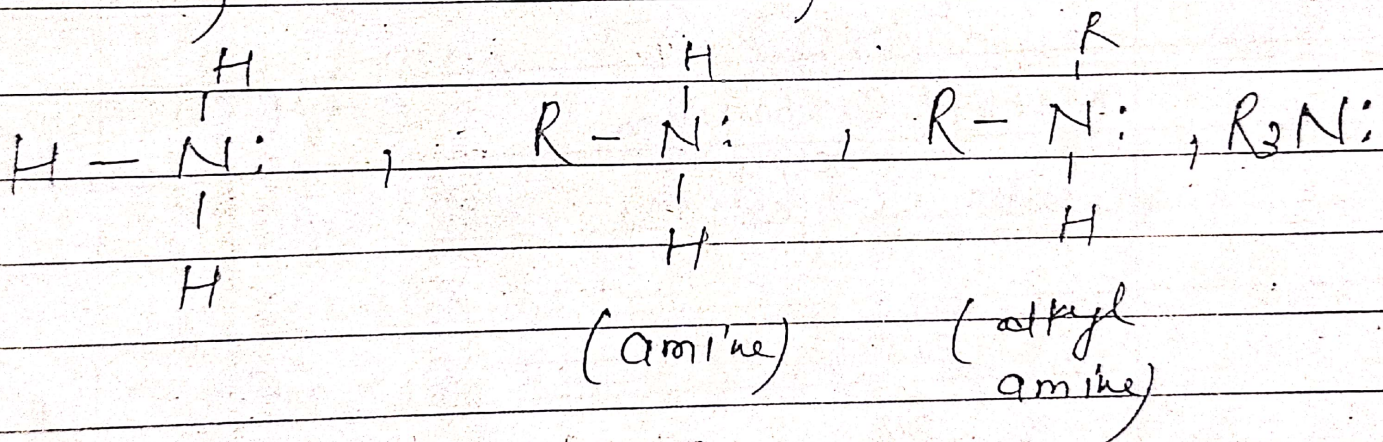
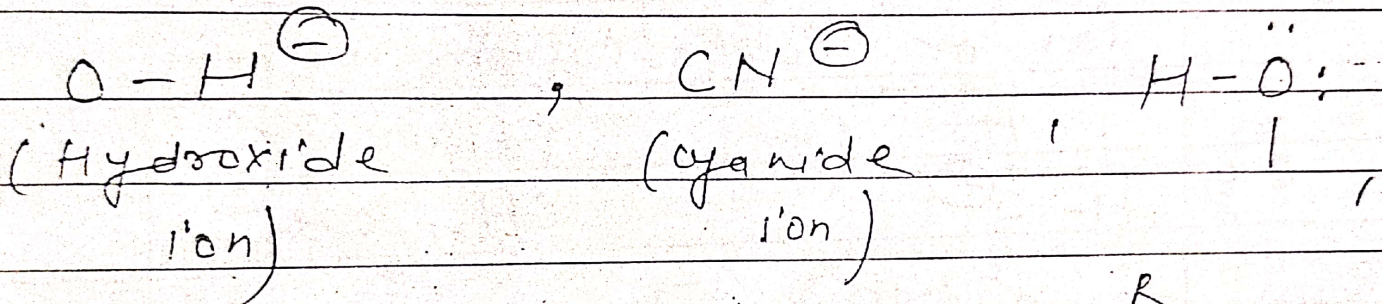
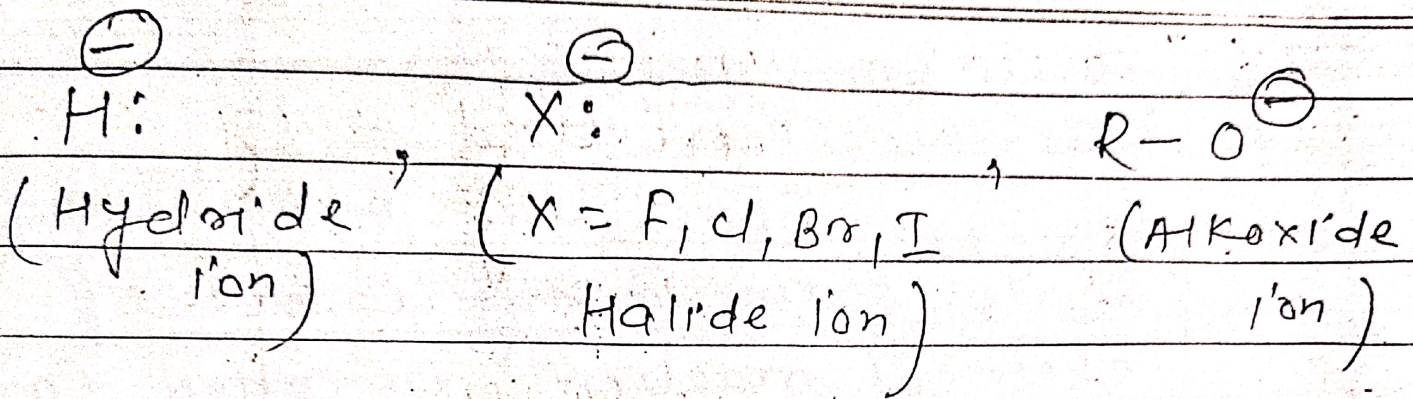
- ①. Electrophilic reagent or Electrophile.
- ②. Nucleophilic reagent or Nucleophile.

①. Electrophilic reagent → The substances (atoms, molecules, cation) which are deficient in electrons, are called Electrophiles i.e. they are electron lovers. Such substances are generally Lewis-acids i.e. they have vacant orbital to accept pair of electrons. They may be cation or neutral.



Such reagents combined with electron rich centres to form the product -

②. Nucleophilic reagent → Such substances (atoms, molecules, anion) which have extra pairs of electrons are called Nucleophiles. They are generally Lewis-bases. They may be anion or neutral (having an unshared pair of electrons).



Nucleophiles attack on electron deficient centres during the course of a chemical reaction.