

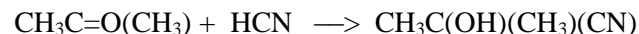
FOUR CLASSIC ORGANIC REACTIONS IN SECOND YEAR 'A' LEVEL CHEMISTRY

(NONE of the reaction conditions are shown)

Nucleophilic Addition Reactions

Carbonyl species typically undergo Nucleophilic Addition reactions

- Propanone + HCN \longrightarrow 2-hydroxy-2-methyl propanonitrile (cf. Year 2, Chapter 17)



- Nitrile + Water \longrightarrow Amide (Year 2, Chapter 19)

here: 2-hydroxypropanonitrile + Water \longrightarrow Ethanamide



Nucleophilic Substitution Reactions (e.g. the classic S_N1 and S_N2 reactions – of which the most common are the hydrolysis reactions)

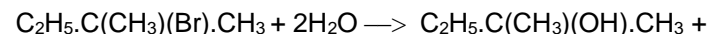
A saturated organic compound cannot undergo anything other than a substitution reaction

- 3° Halogenoalkanes react by way of S_N1 mechanisms.

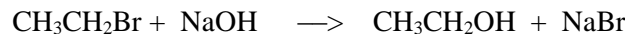
- 2° Halogenoalkanes react by both S_N1 and S_N2 mechanisms.

- 1° Halogenoalkanes react by way S_N2 mechanism (where inversion takes place).

e.g. S_N1: 2-bromo-2-methylbutane (a 2° Halogenoalkane) + Water (cf. Year 2, Chapter 24)



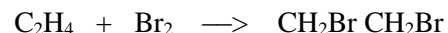
e.g. S_N2: Bromoethane (a 1° Halogenoalkane) + OH⁻ \longrightarrow Ethanol (cf. Year 1, Chapter 7)



Electrophilic Addition Reactions

Alkenes undergo Electrophilic Addition reactions with Water(Steam)/Halogens/Hydrogen Halides/etc

- Ethene + Bromine \longrightarrow 1,2-dibromoethane

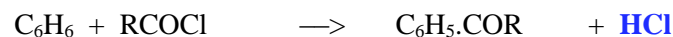


(There are a large number of such reactions in Year 1, Chapter 5)

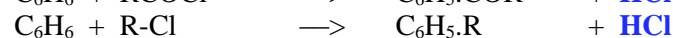
Electrophilic Substitution Reactions

The five classic EAS reactions of Benzene viz.

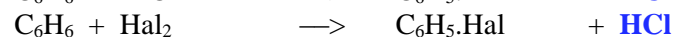
- Benzene + RCOCl (with an FC catalyst) \longrightarrow Acyl.Benzene



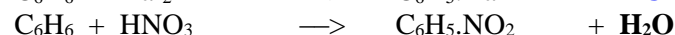
- Benzene + R-Cl (with an FC catalyst) \longrightarrow Alkyl.Benzene



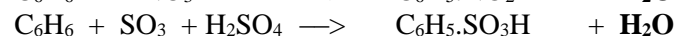
- Benzene + Halogen (with an FC catalyst) \longrightarrow Hal-Benzene



- Benzene + Nitric Acid (+ 2H₂SO₄) \longrightarrow Nitrobenzene



- Benzene + fuming Sulphuric Acid \longrightarrow Benzenesulphonic Acid



- The reaction of Benzene with an Alkene in the “Cumene” process as the first step in creating Phenol is another EAS reaction viz.

- Benzene + Propene \longrightarrow 1-methylethylbenzene \longrightarrow Phenol + Propanone

