Allylic Substitution:

$CH_2=CH-CH_3 + Cl_2 \xrightarrow[700-800\,K]{\text{high temp.}} CH_2=CH-CH_2-Cl$

3-Chloroprop-1-ene

Allylic halogenation:

$CH_3-CH_2-CH_3 + Cl_2 \xrightarrow{U.V}$ $CH_3-CH_2-CH_2-Cl$ + $CH_3-\underset{Cl}{CH}-CH_3$

Alkyl chloride.

$CH_2=CH-CH_3 + Cl_2 \xrightarrow[700-800^\circ C]{\text{high temp}}$ $CH_2=CH-CH_2-Cl$

Allyl chloride

2) Tertiary Alcohols :-

(a) By the Action of halogen Acid (HX) :-

$R-\overset{\overset{|}{}}{\underset{\underset{|}{}}{C}}-OH + HX \longrightarrow R-X + H_2O$

Haloalkane

Eg :- (I) HCl

(i) $CH_3-CH_2-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-OH + HCl \xrightarrow{\text{Anhydrous}}$

Haloalkane

Eg:- (H) HCl

(i) $CH_3-CH_2-OH + HCl \xrightarrow[ZnCl_2]{\text{Anhydrous}} CH_3-CH_2-Cl + H_2O$.

(Groove's process)

* $ZnCl_2$ is a lewis Acid which helps in breaking of C-O bond.

(ii) $CH_3-\underset{\underset{H}{|}}{\overset{\overset{CH_3}{|}}{C}}-OH + HCl \xrightarrow{ZnCl_2} CH_3-\underset{\underset{CH}{|}}{\overset{\overset{CH_3}{|}}{C}}-Cl + H_2O$.

Isopropyl Alcohol.

* Tertiary alcohol are very reactive hence do not require $ZnCl_2$.

$CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-OH + HCl \longrightarrow CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-Cl + H_2O$.

(I) HBr Bromoalkane.

$CH_3-CH_2-OH + HBr \xrightarrow[\text{Heat.}]{\text{Conc. } H_2SO_4} CH_3-CH_2-Br + H_2O$

Bromoethane.

* HBr is also insitu by the action of conc. H_2SO_4 on KBr.
↳ prepared at the moment in (lab)

$CH_3-CH_2-OH + KBr + H_2SO_4 \xrightarrow{\text{Heat.}} CH_3-CH_2-Br + KHSO_4 + H_2O.$

(II) Iodoalkanes HI

$CH_3CH_2-OH + HI \xrightarrow{\text{Reflux.}} CH_3-CH_2-I + H_2O$

Insitu

$CH_3-CH_2-OH + KI + H_3PO_4 \xrightarrow{\text{Heat}} CH_3-CH_2-I + KH_2PO_4 + H_2O$

H_2O.

III. **Iodoalkanes** HS

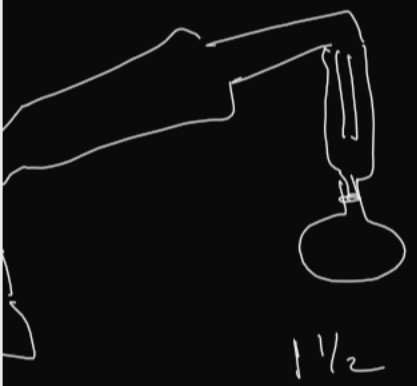
$CH_3CH_2OH + HI \xrightarrow{\text{Reflux}} CH_3-CH_2-I + H_2O$

Iodine

$CH_3-CH_2-OH + KI + H_3PO_4 \xrightarrow{\text{Heat}} CH_3-CH_2-I + KH_2PO_4 + H_2O$

Ethyl Alcohol

Pot. dihydrogen phosphate



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* Conc H_2SO_4 with secondary and tertiary alcohol on heating undergoes dehydration and form alkene

Reactivity of Alcohol (carbocation) $C^{\oplus}$ ofo

Stability $C^{\oplus}$ → $3^\circ > 2^\circ > 1^\circ$

Reactivity of $3^\circ > 2^\circ > 1^\circ$.

By the Action of Phosphorous halides. (Sunday)

→ NCERT

→ MCQs.

1) Chloroalkanes :-

(i) $CH_3CH_2-OH + PCl_5 \longrightarrow CH_3-CH_2-Cl + POCl_3 + HCl$

Ethyl alcohol — Phosphorus Pentachloride — Phosphorous oxychloride

(ii) Bromoalkane and Iodoalkane.

PBr_3 PI_3 → insitu.

Insitu PBr_3 → Action of red Phosphorous on Br_2

$\# \quad 2P + 3Br_2 \longrightarrow 2PBr_3$

eg:- $\# \quad CH_3CH_2-OH + PBr_3 \longrightarrow CH_3-CH_2-Br + H_3PO_3$

Ethyl Bromide.

$2P + 3I_2 \longrightarrow 2PI_3$