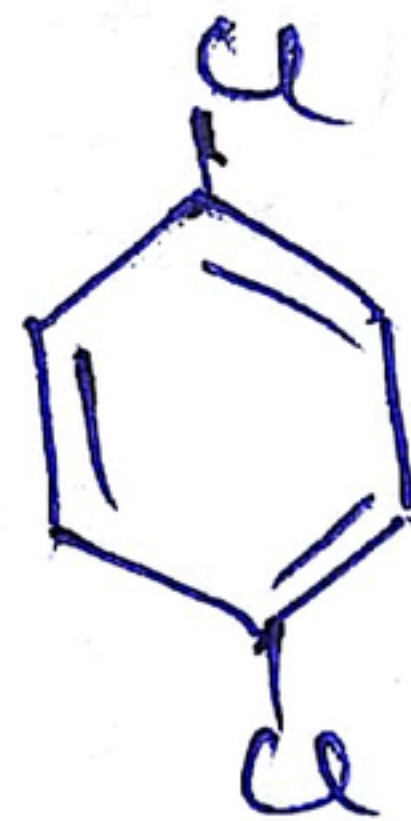
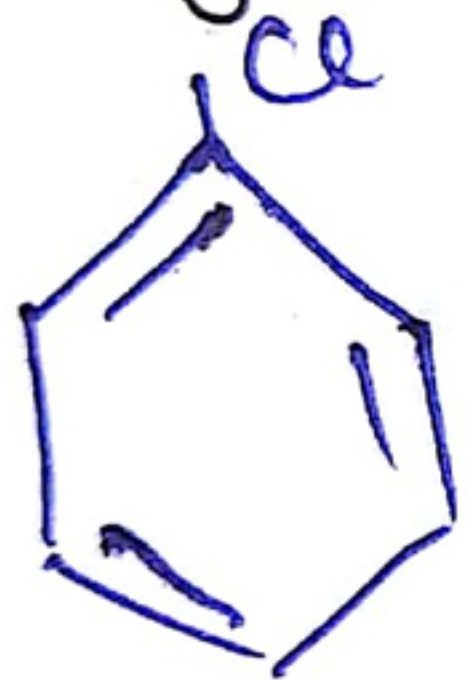


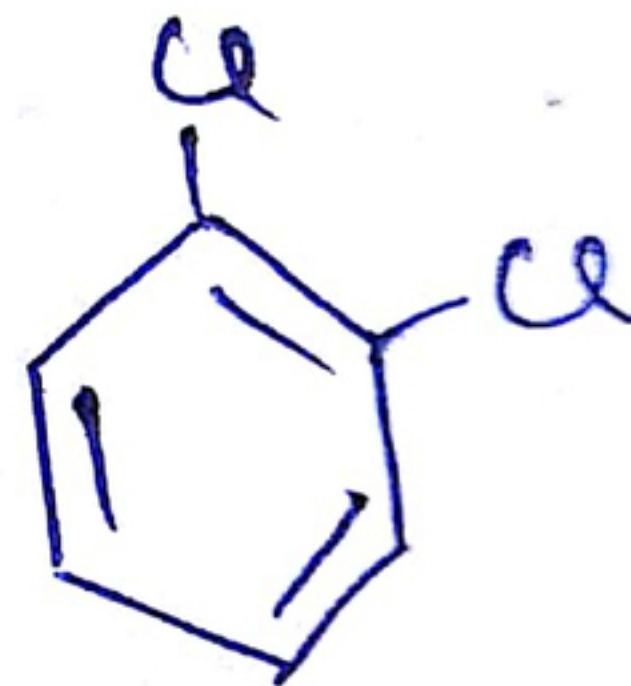
## 2) Electrophilic Substitution Reactions:-

Halogens are deactivating but O, p-directing.  
Thus, chlorination, nitration, sulphonation and Friedel Crafts reaction give a mixture of O and p-chloro substituted derivatives.

### (i) Halogenation :-

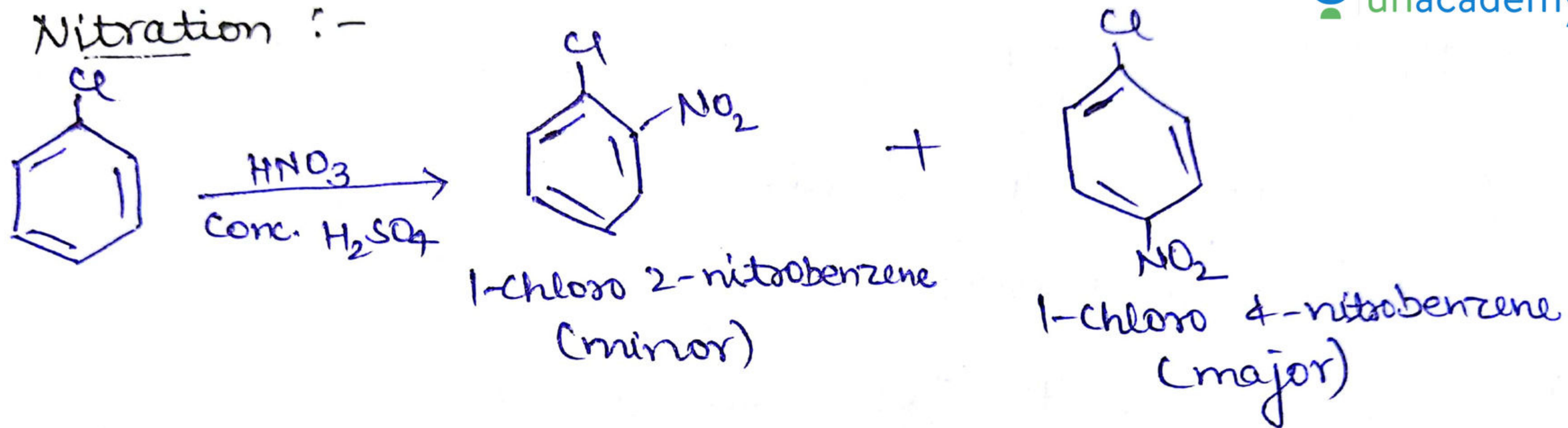


1,4-dichlorobenzene  
(major)

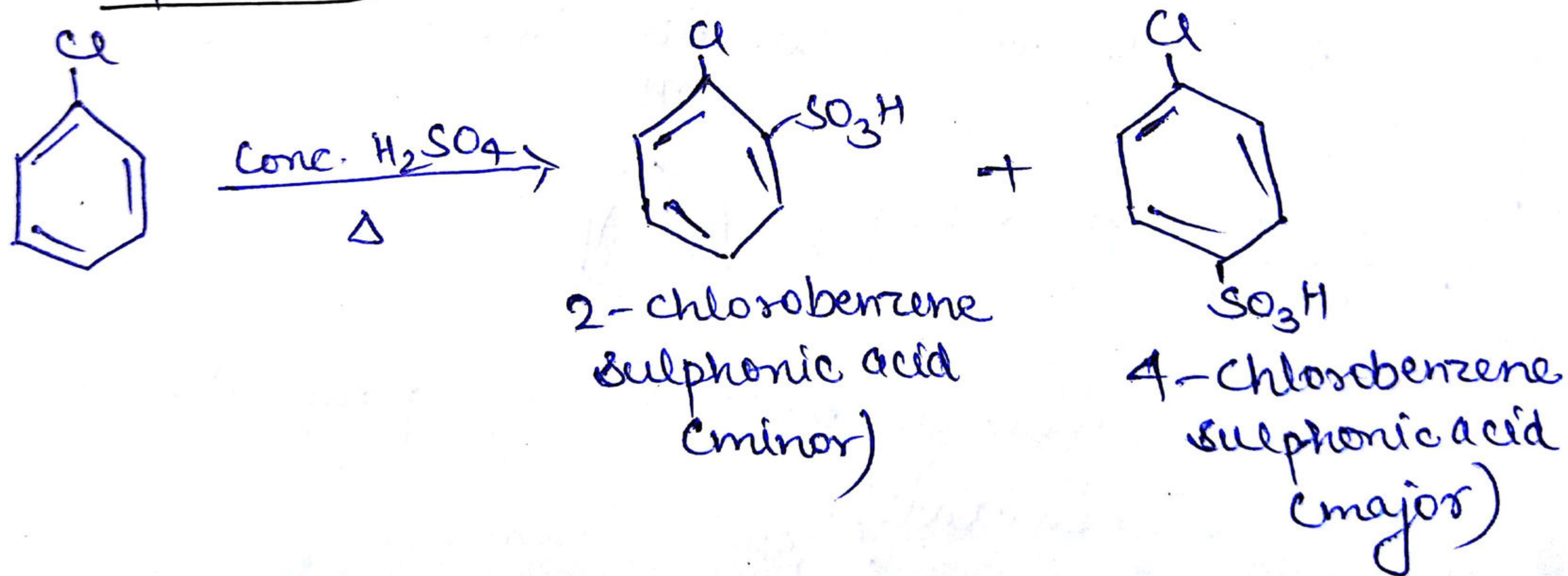


1,2-dichlorobenzene  
(minor)

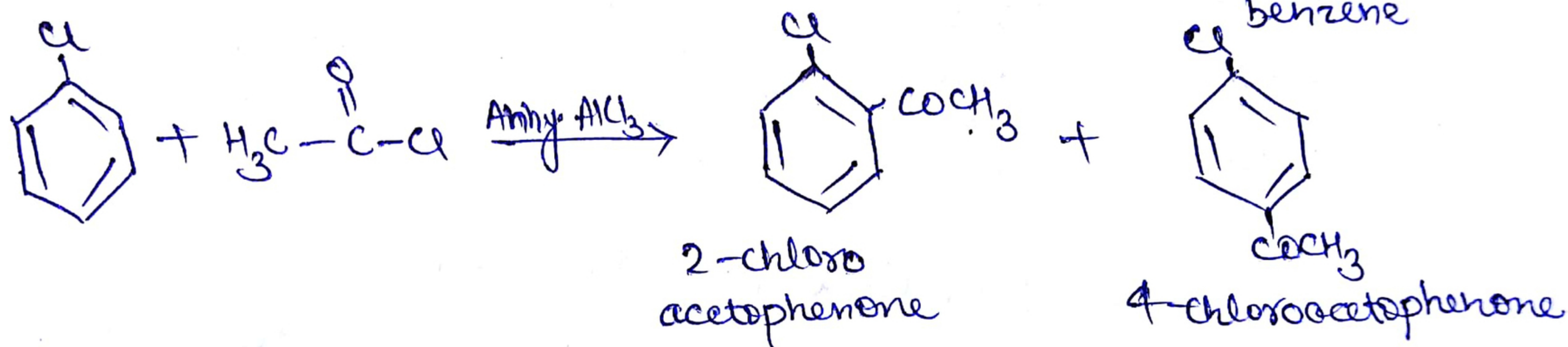
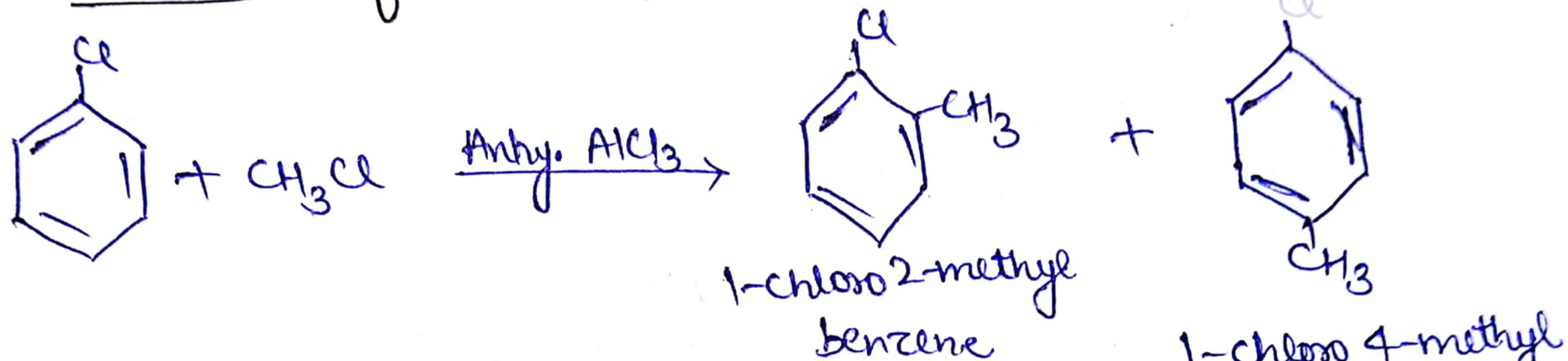
ii) Nitration :-



iii) Sulphonation :-



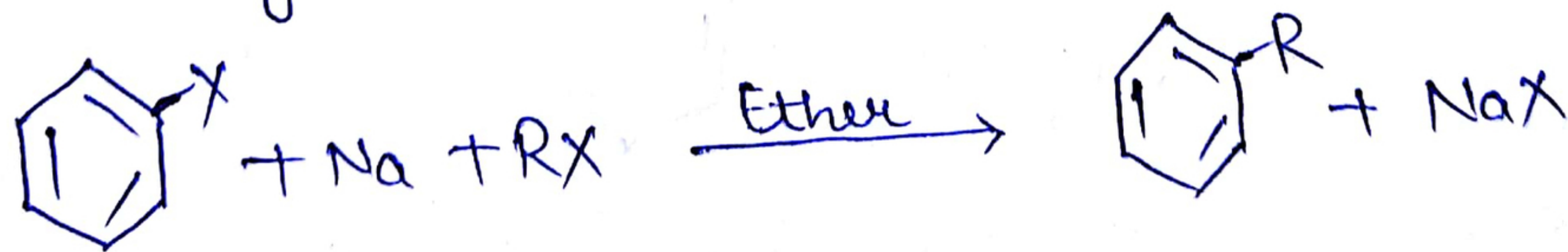
## 1v) Friedel-Crafts reaction :-



## 3) Reaction with Metals :-

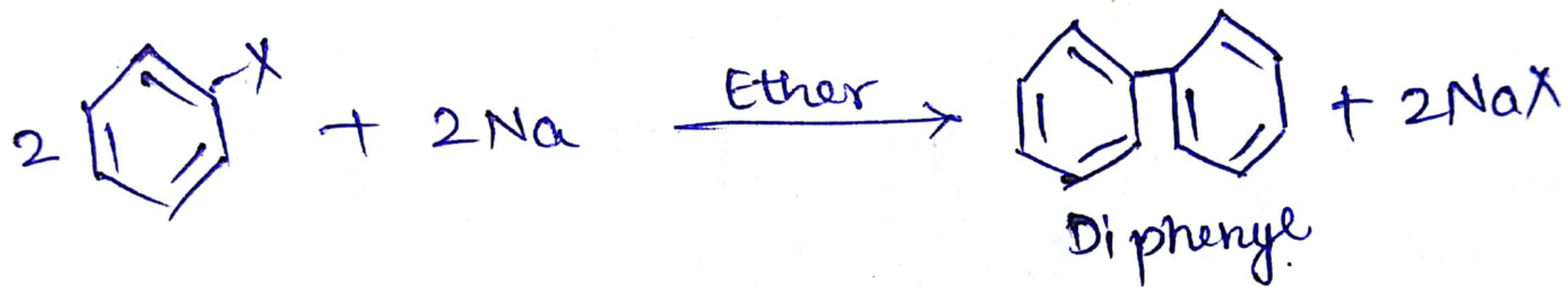
### i) Wurtz-Fittig Reaction :-

A mixture of an alkyl halide and aryl halide gives an alkylarene when treated with sodium in dry ether and is called Wurtz-Fittig Reaction.

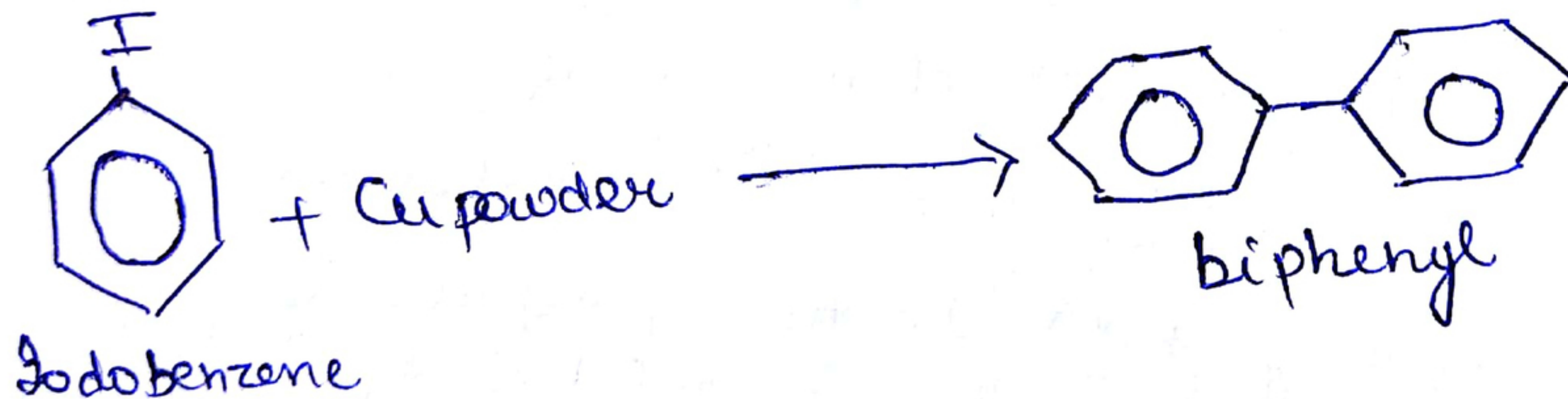


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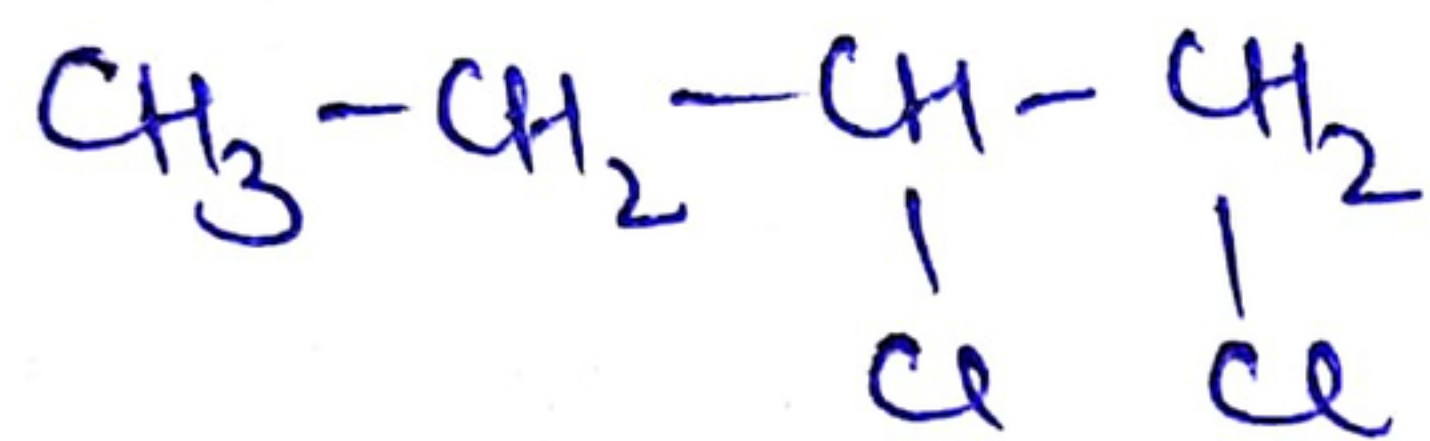
ii) Fittig Reaction :-  
Aryl halides also give analogous compounds when treated with sodium in dry ether, in which two aryl groups are joined together. It is called Fittig reaction.



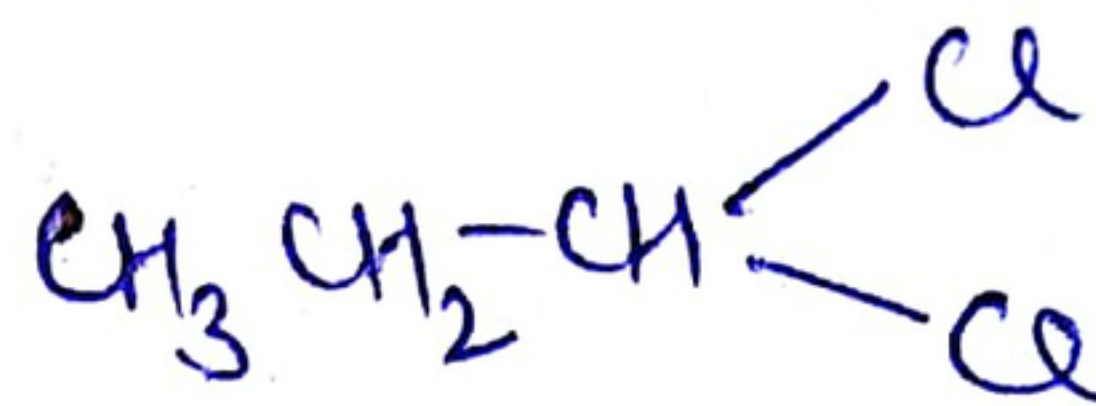
iii) Ullmann reaction :-



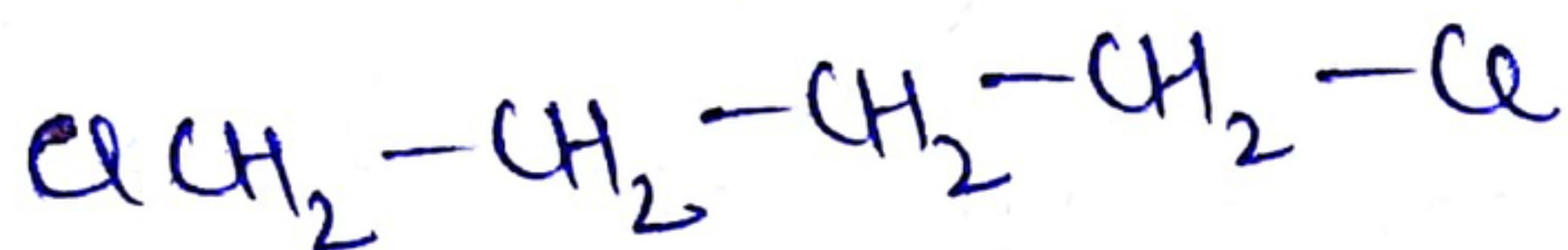
1) Dichloromethane (Methylene chloride) :-



(Vic or vicinal-dichloride)



(Gem or geminal-dichloride)



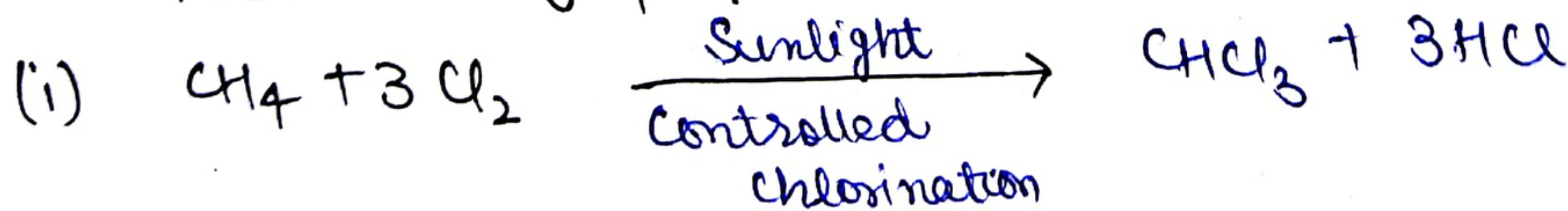
(Isolated dichloride)

Dichloromethane ( $\text{CH}_2\text{Cl}_2$ ) is widely used as solvent, as a propellant in aerosols.

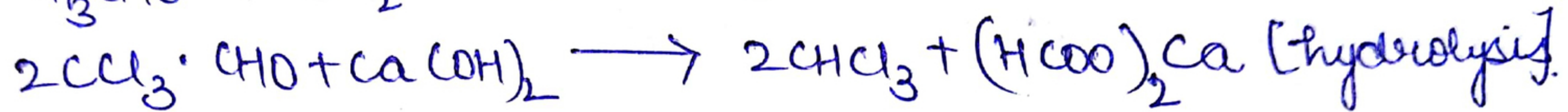
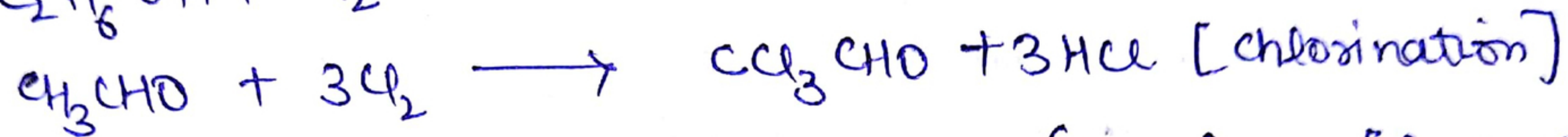
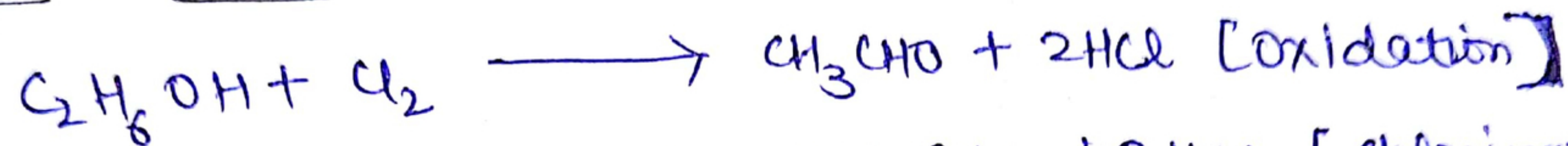
Direct contact of dichloromethane in humans causes intense burning and milk redness of skin.

2) Trichloromethane (Chloroform) ( $\text{CHCl}_3$ ) :-

Methods of preparation

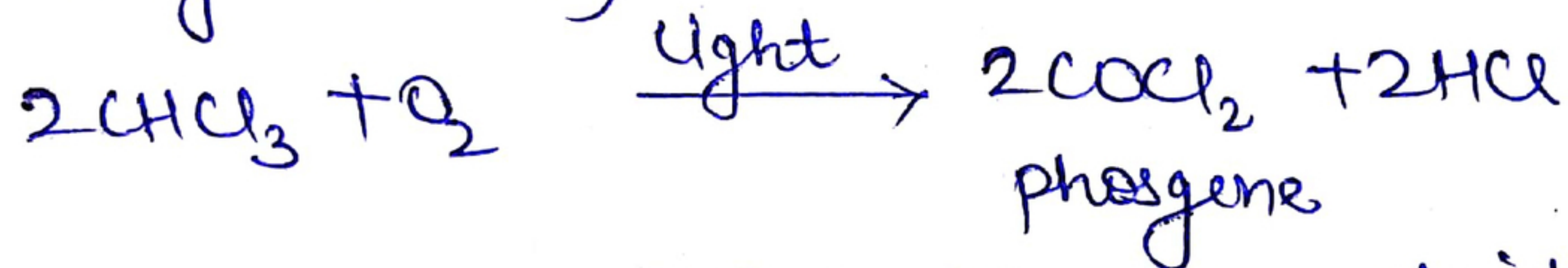


ii) CH<sub>3</sub> form reaction



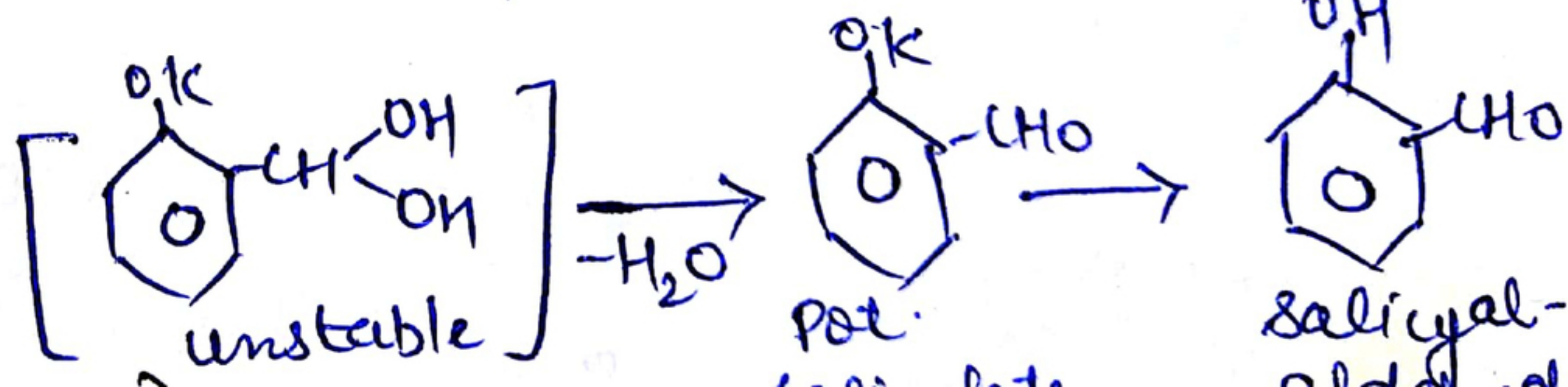
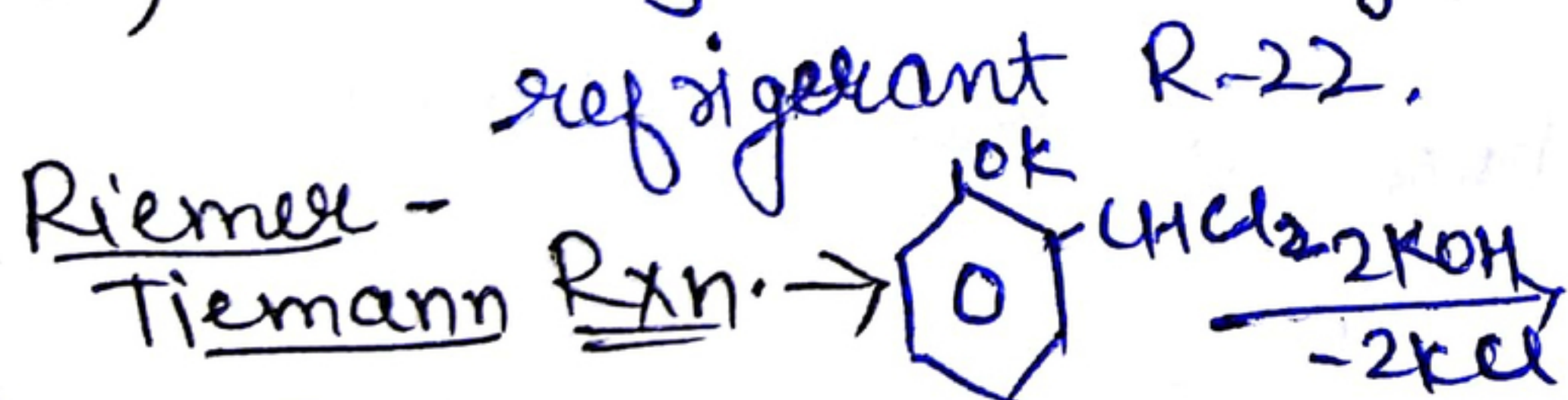
Properties:-

a) Oxidation of  $CHCl_3$  gives poisonous gas phosgene (carbonyl chloride).



1% ethanol is added to chloroform which converts harmful phosgene gas into diethyl carbonate.

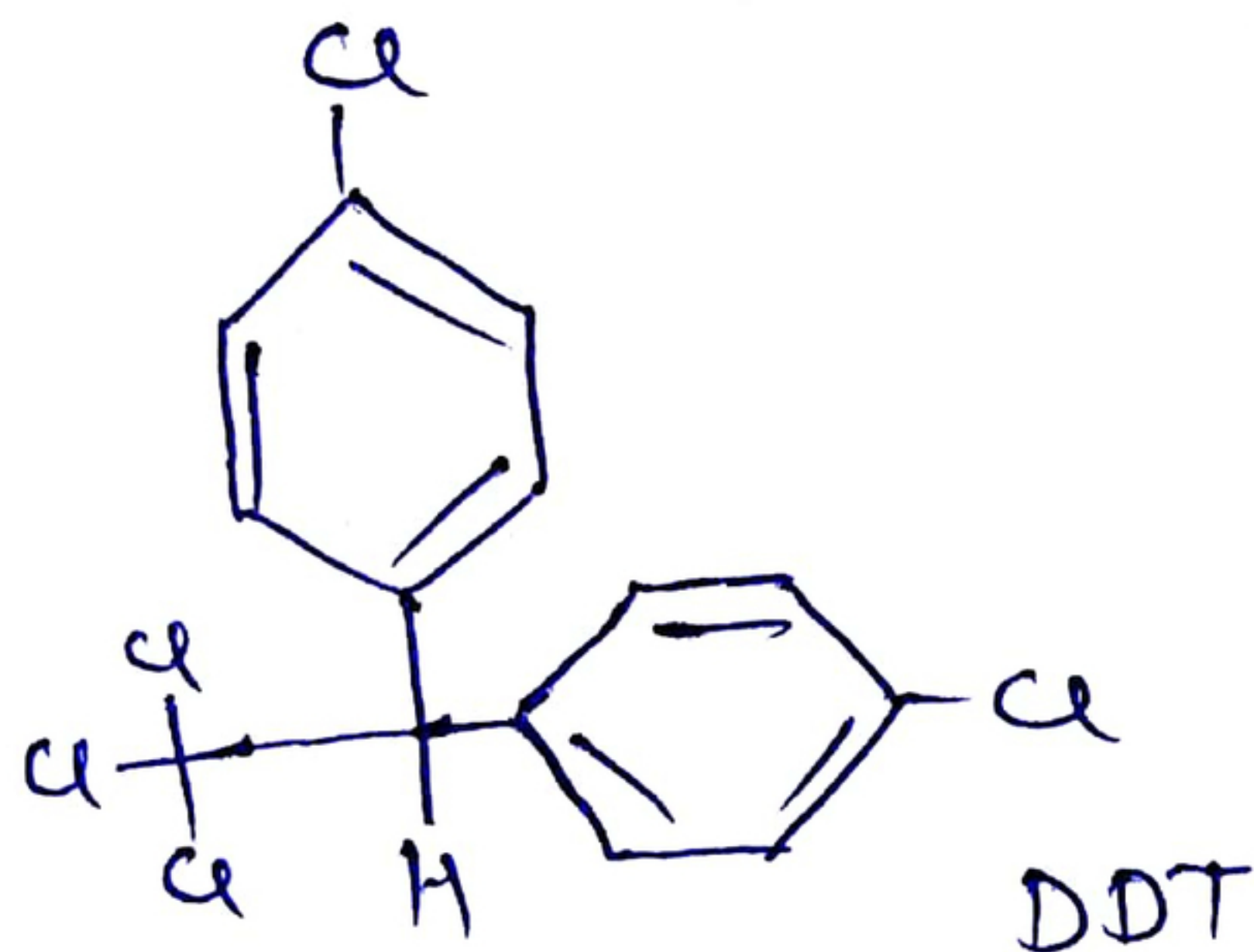
b-)  $CHCl_3$  is widely used in the production of freon



5) Freons :-

The chlorofluorocarbon compounds of methane and ethane are collectively known as freons. These are usually produced for aerosol propellants, refrigeration and air conditioning. Carbon tetrachloride when reacts with antimony trifluoride in the presence of  $SbCl_5$  as catalyst, dichlorofluoromethane (freon) is obtained.

6) DDT (p,p'-Dichlorodiphenyltrichloroethane)



DDT is the first chlorinated organic insecticide. Its stability and fat solubility is a great problem.

It is prepared from chloral and chlorobenzene in the presence of conc.  $H_2SO_4$ .