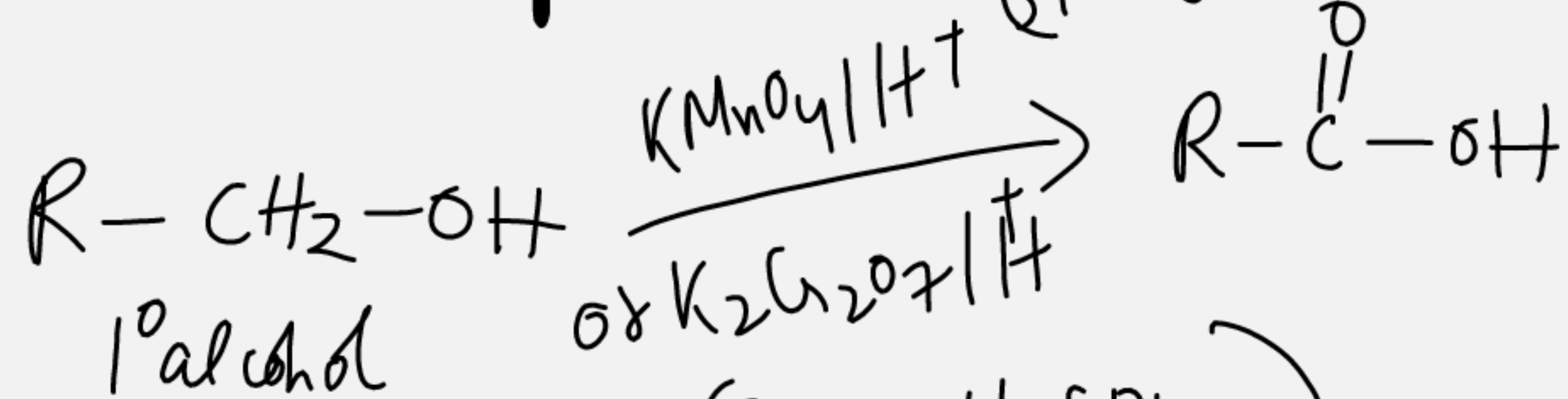


# Oxidation of alcohol (Strong OA)

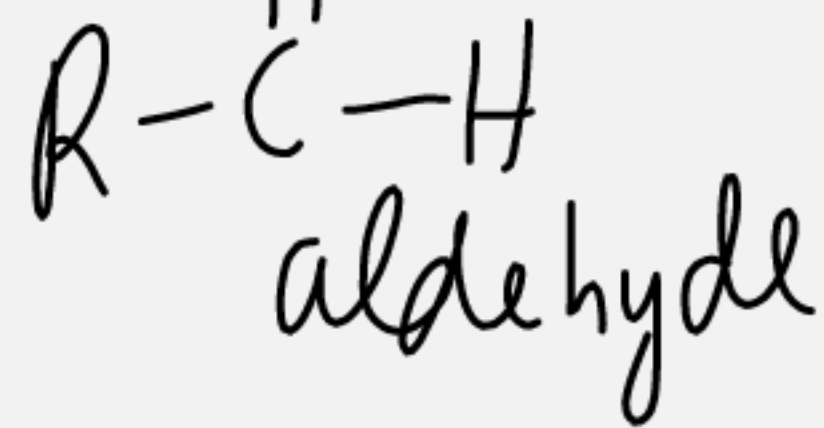


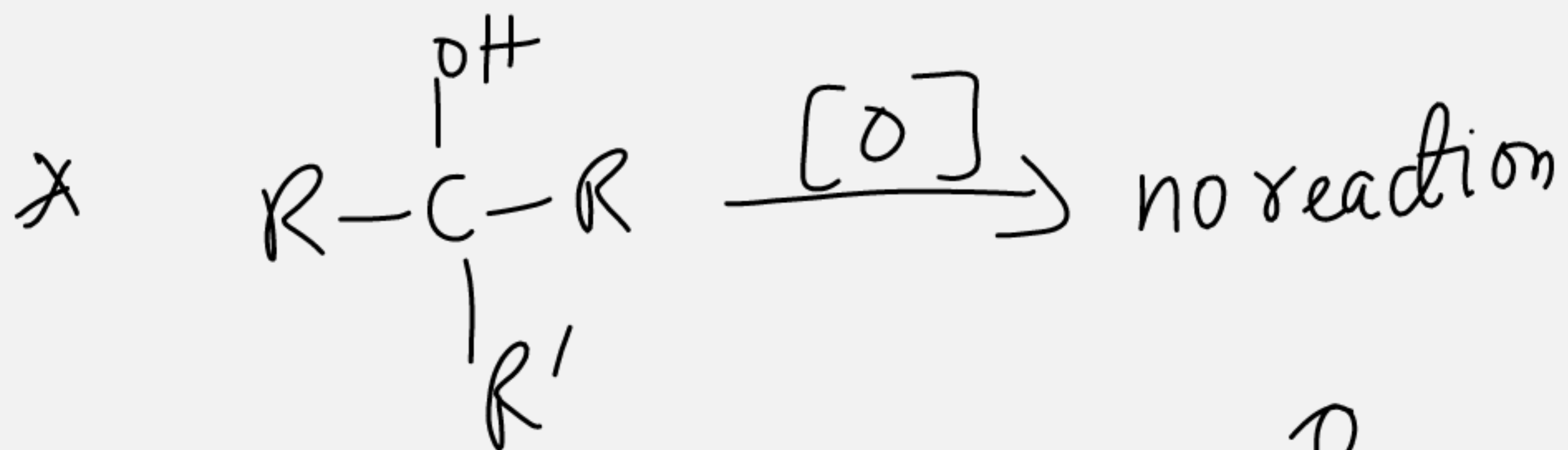
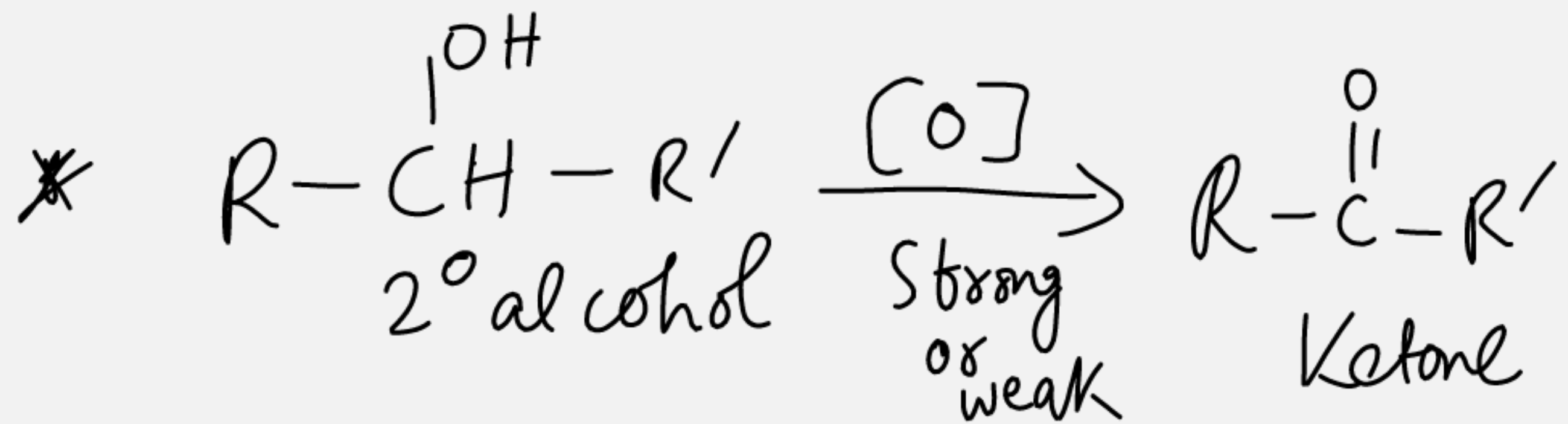
or  $(CrO_3-H_2SO_4)$   
Jones Reagent

Weak  
OA

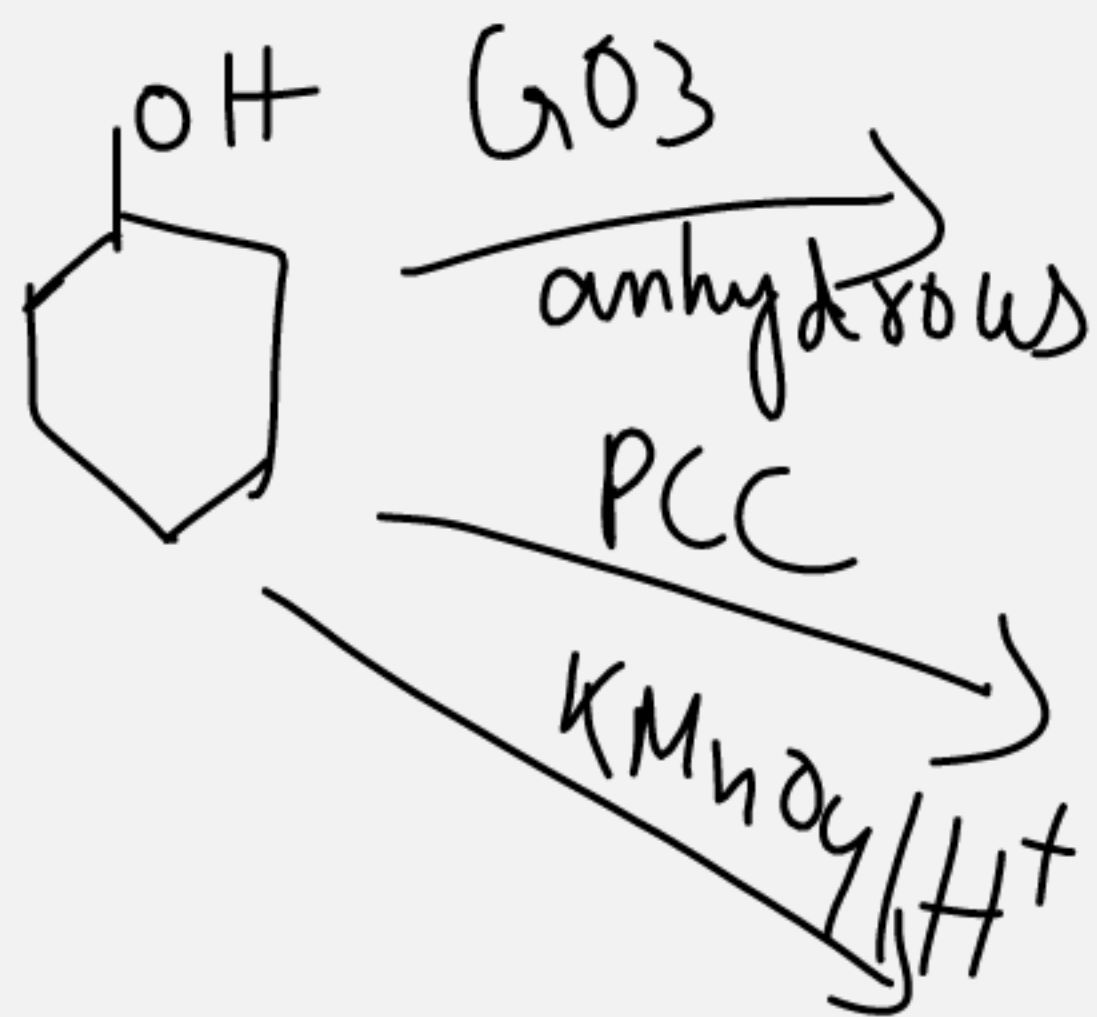
$CrO_3$   
anhydrous

or PCC (Pyridinium chloro chromate)

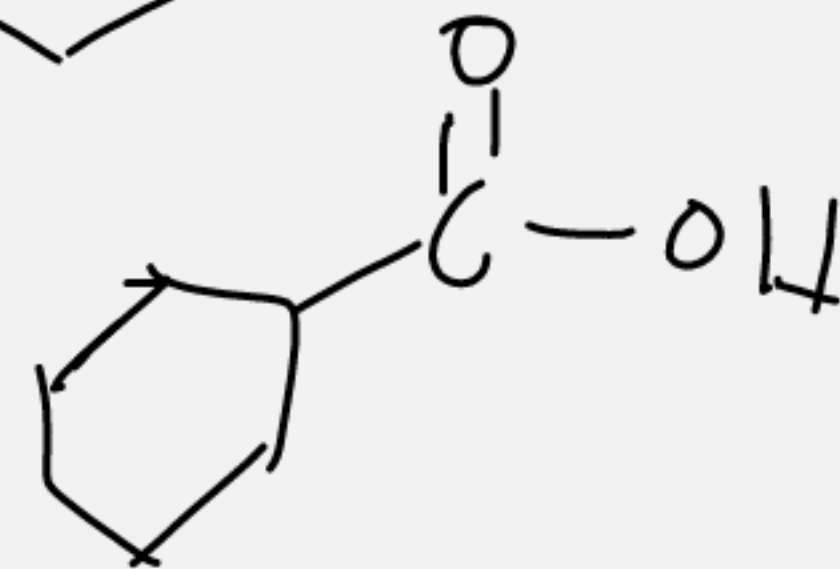
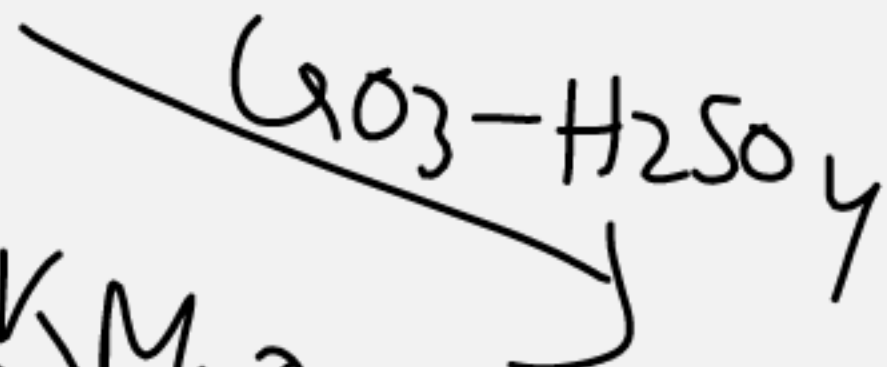
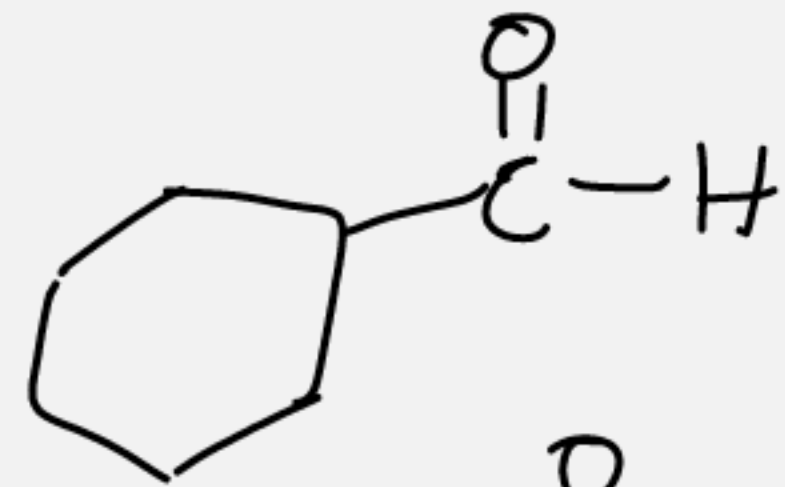
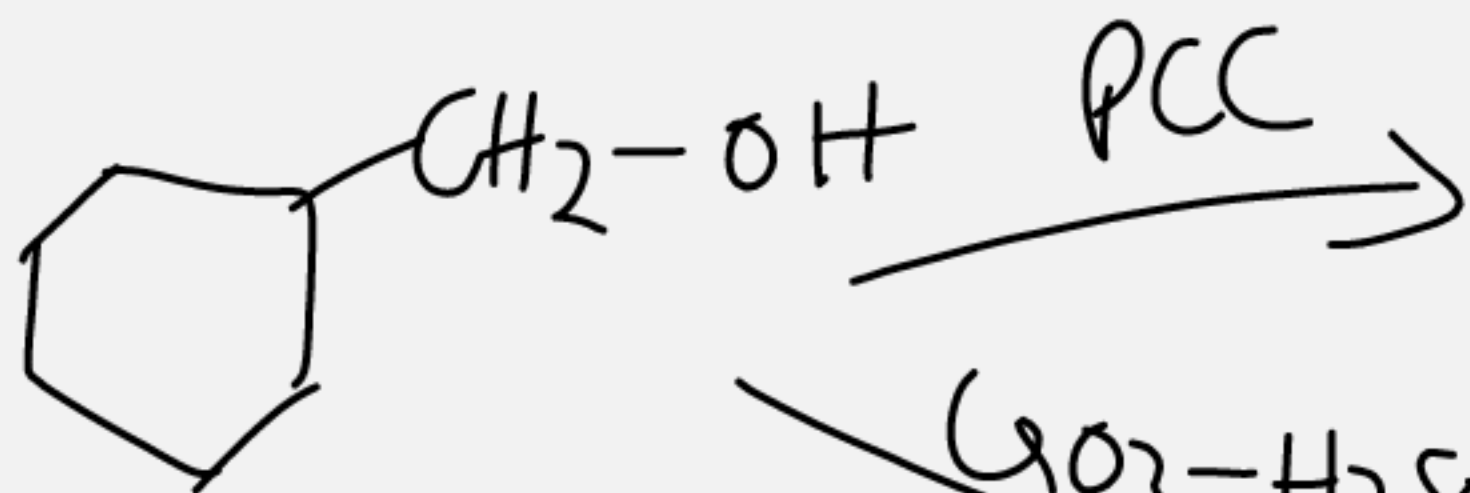




Q.

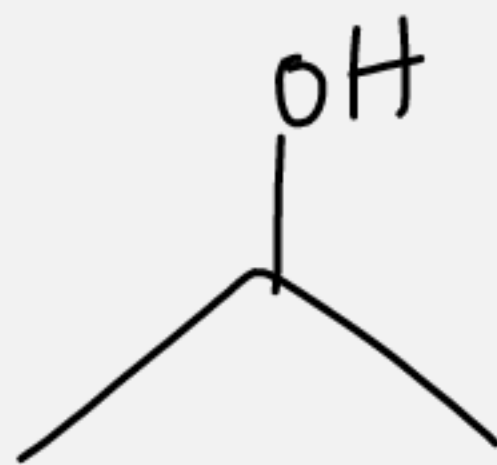


Q.



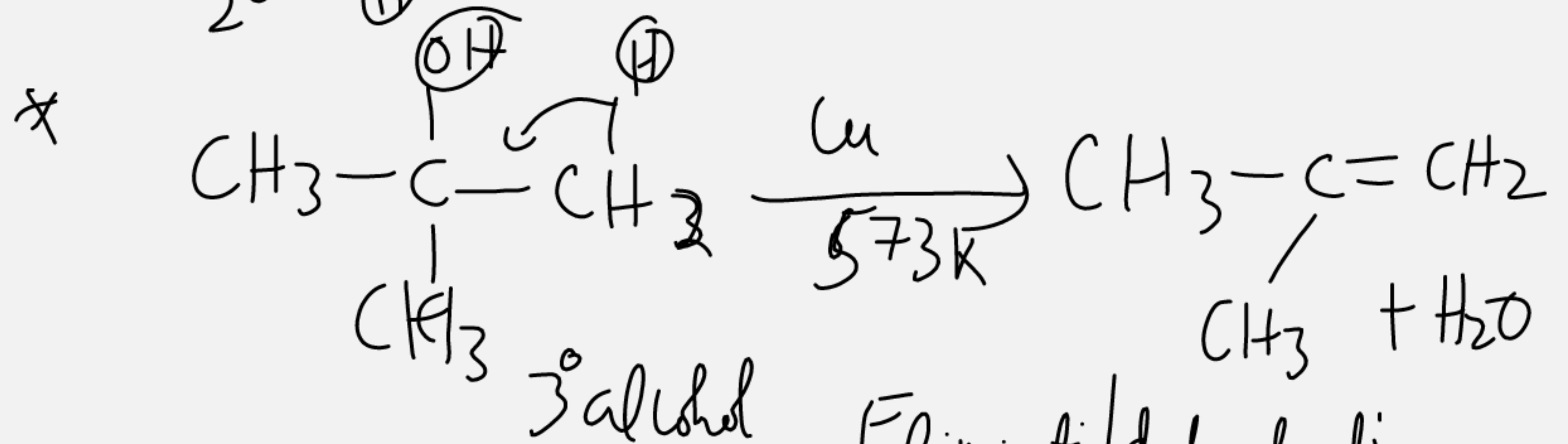
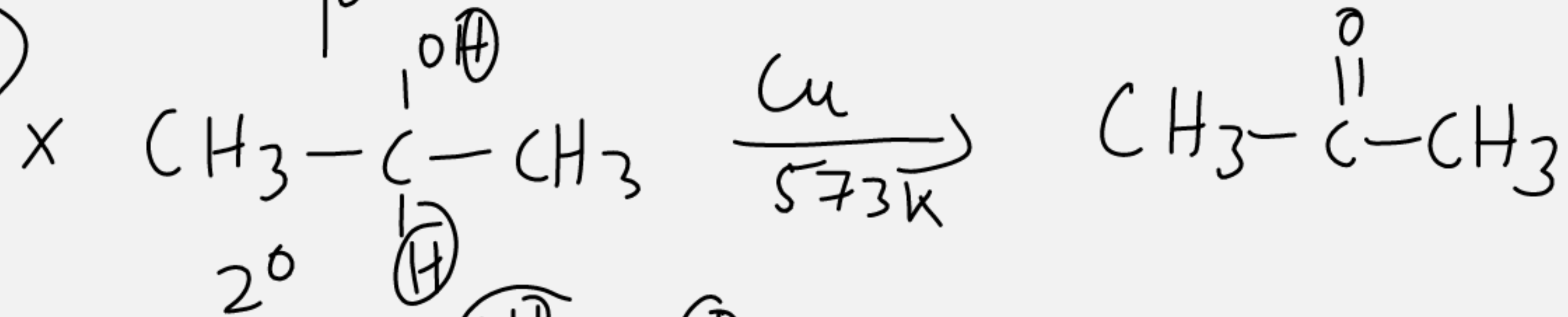
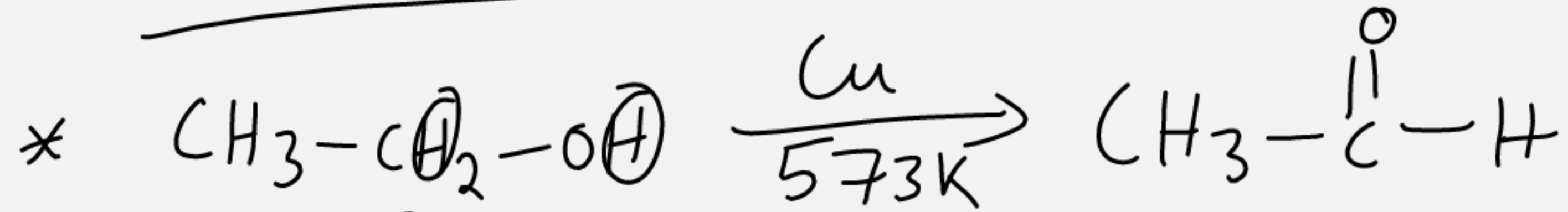
1) (Acid)

\*



# Oxidation with Cu metal

dehydrogenation



3° alcohol

Elimination/dehydration

Test for alcohol  
 $1^\circ, 2^\circ, 3^\circ \rightarrow$  Lucas  $\xrightarrow{1^\circ \text{ alcohol}}$  white turbidity on heating after long time  
 $\xrightarrow{2^\circ \text{ alcohol}}$  || turbidity in 3-5 mins  
 $\xrightarrow{3^\circ \text{ alcohol}}$  || || immediate

Conc. HCl + anhy.  $ZnCl_2$

Victor-Meyer Test

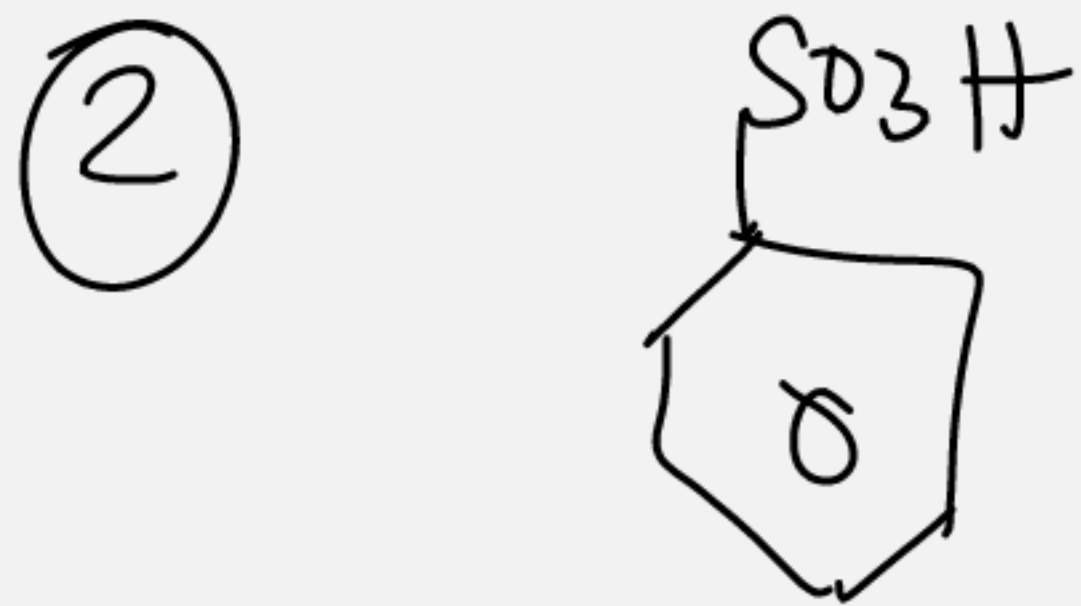
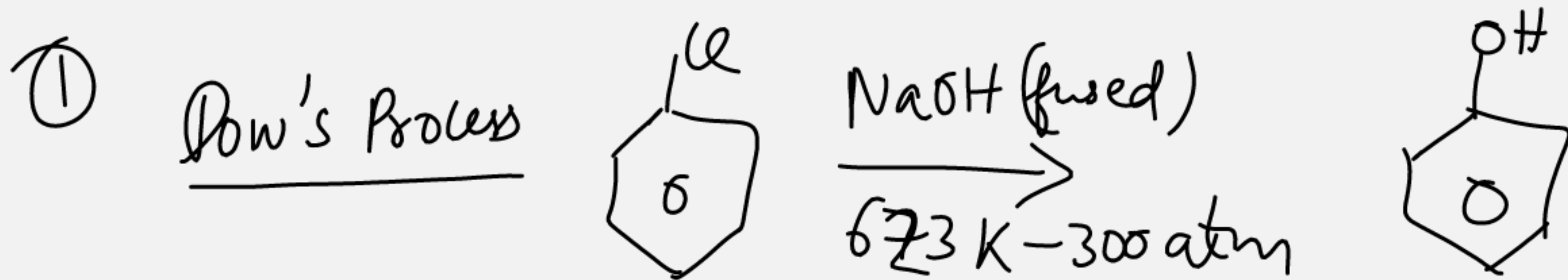
$1^\circ \rightarrow$  Red

$2^\circ \rightarrow$  Blue

$3^\circ \rightarrow$  Colorless

RBC

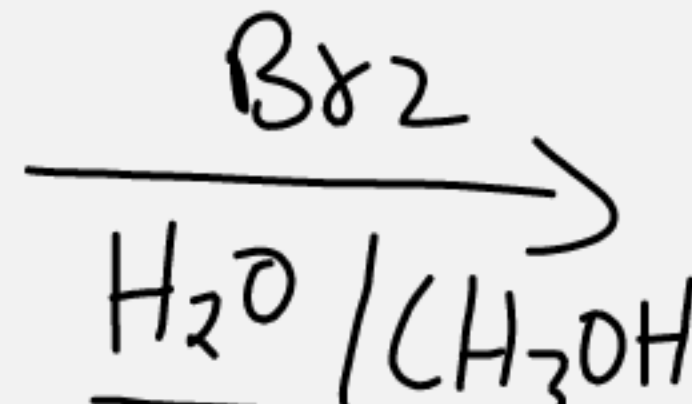
# Preparation of ~~alcohol~~ Phenol



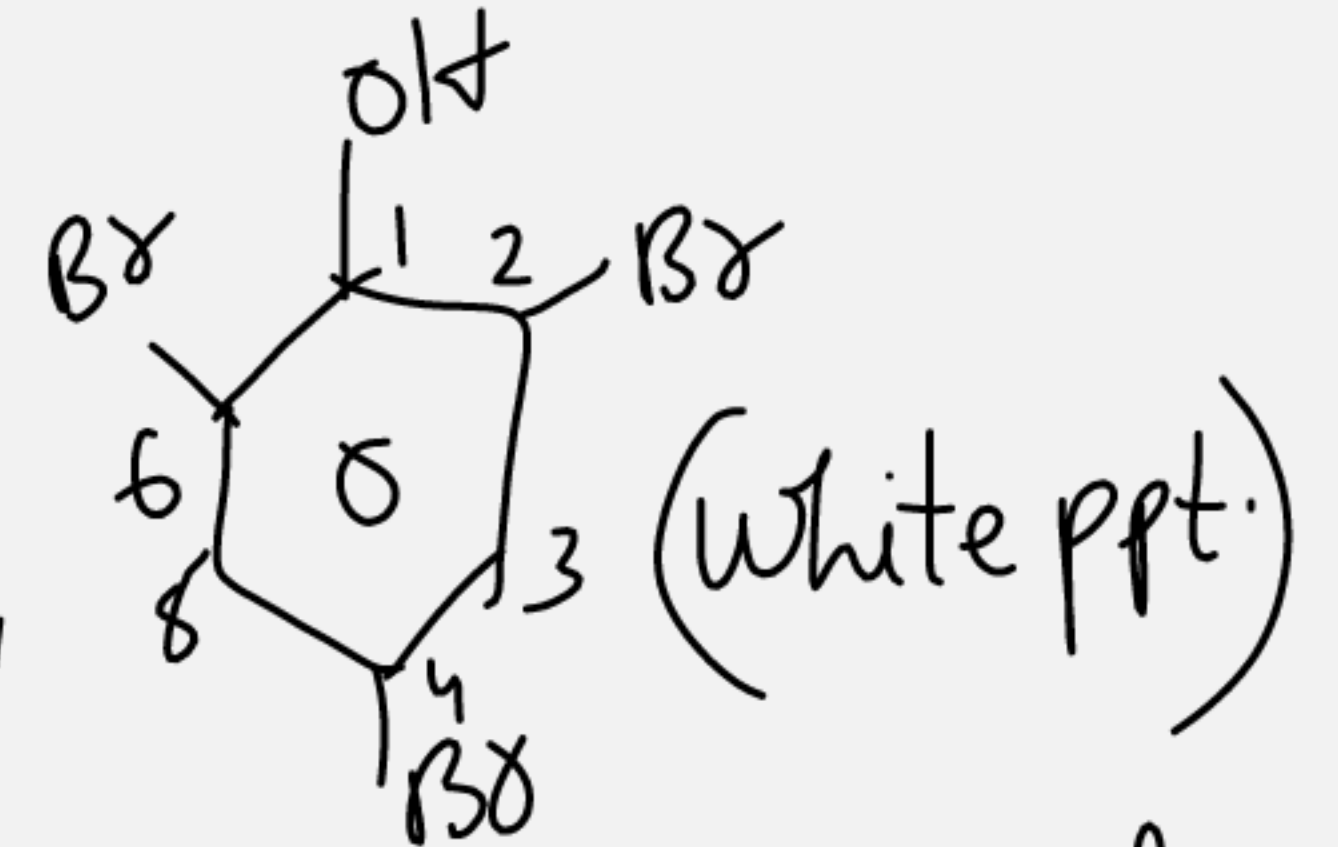
# Rxn of Phenols

## 1) Electrophilic Aromatic Substitution

### (a) Halogenation



(polar medium)



2,4,6-Tribromophenol



$\text{CS}_2$  (carbon disulphide)  
non polar medium



(major)

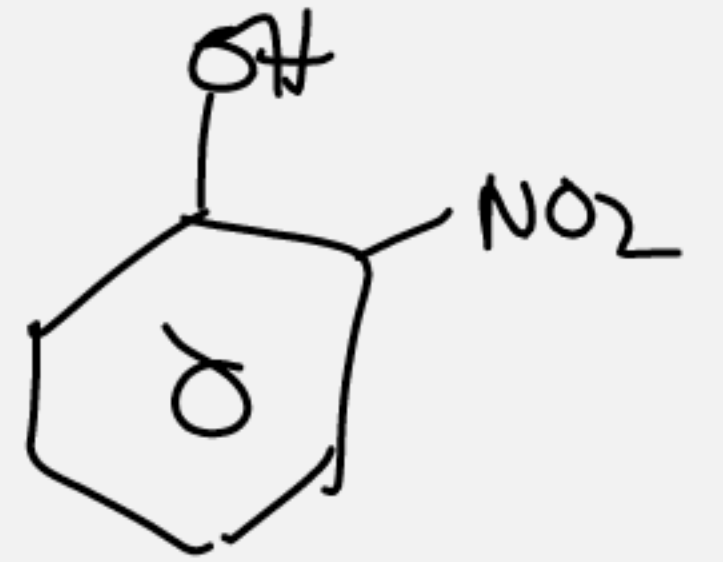


(minor)

⑥ Nitration

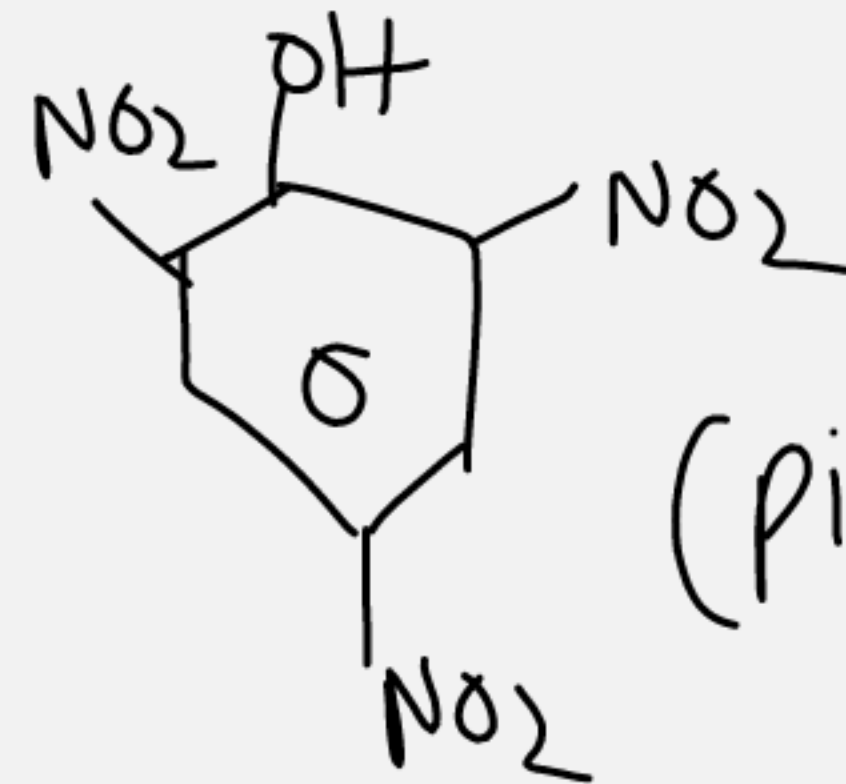
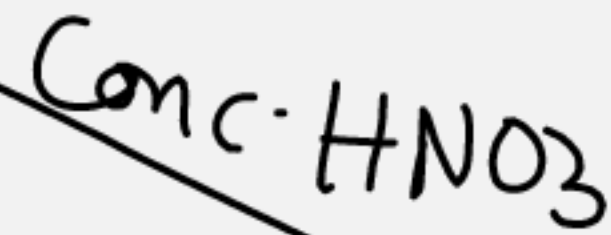


+



minor

$NO_2$  (p major)



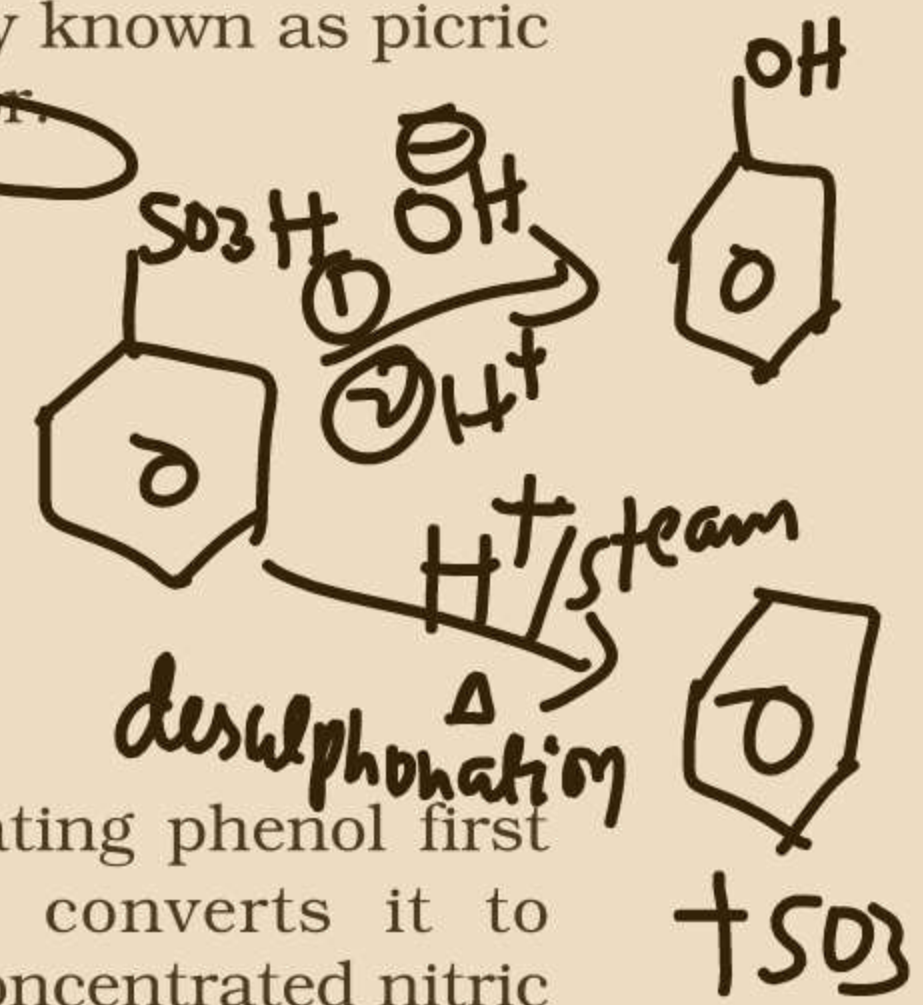
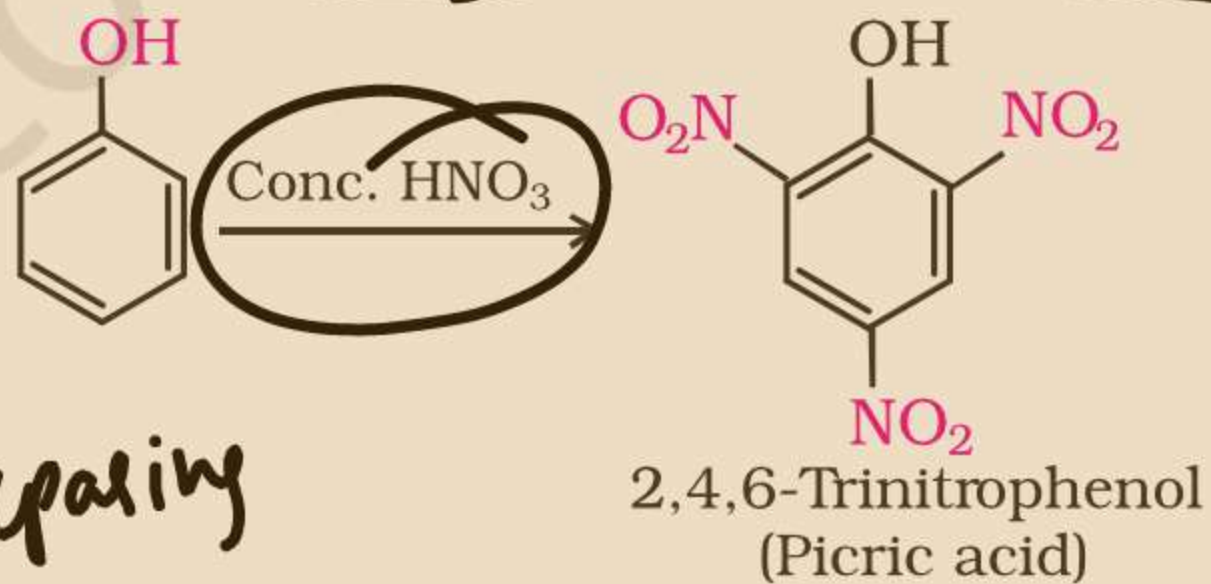
(picric acid)

2,4,6-Trinitrophenol



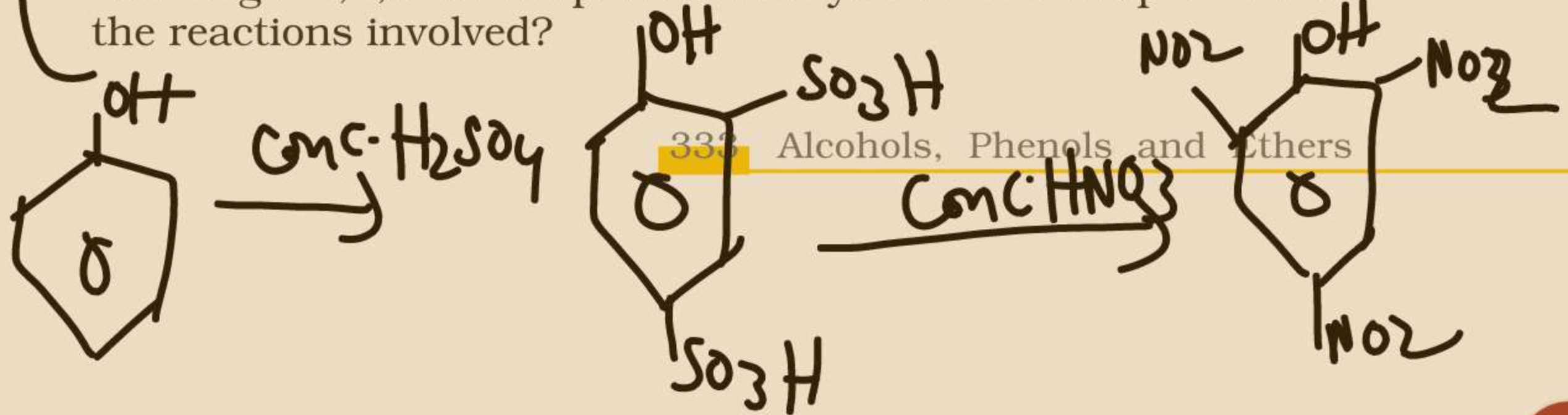
electron withdrawing  $-NO_2$  groups which facilitate the release of hydrogen ion.

with concentrated nitric acid, phenol is converted to 2,4,6-trinitrophenol. The product is commonly known as picric acid. The yield of the reaction product is poor.



New Method of preparing

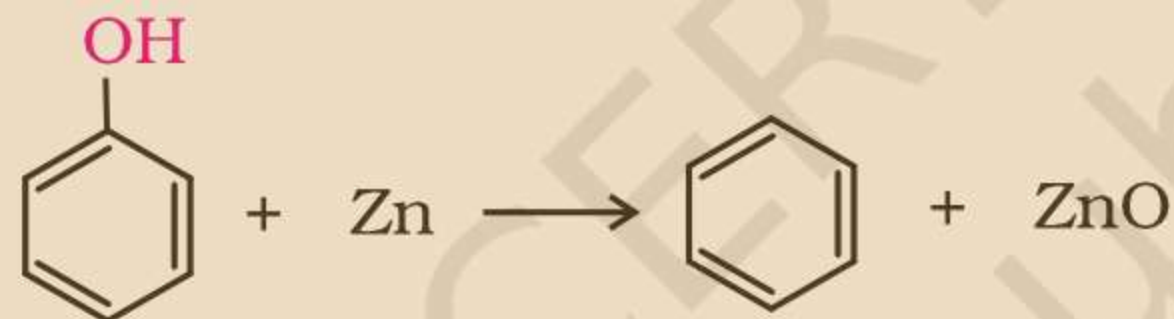
Nowadays picric acid is prepared by treating phenol first with concentrated sulphuric acid which converts it to phenol-2,4-disulphonic acid, and then with concentrated nitric acid to get 2,4,6-trinitrophenol. Can you write the equations of the reactions involved?



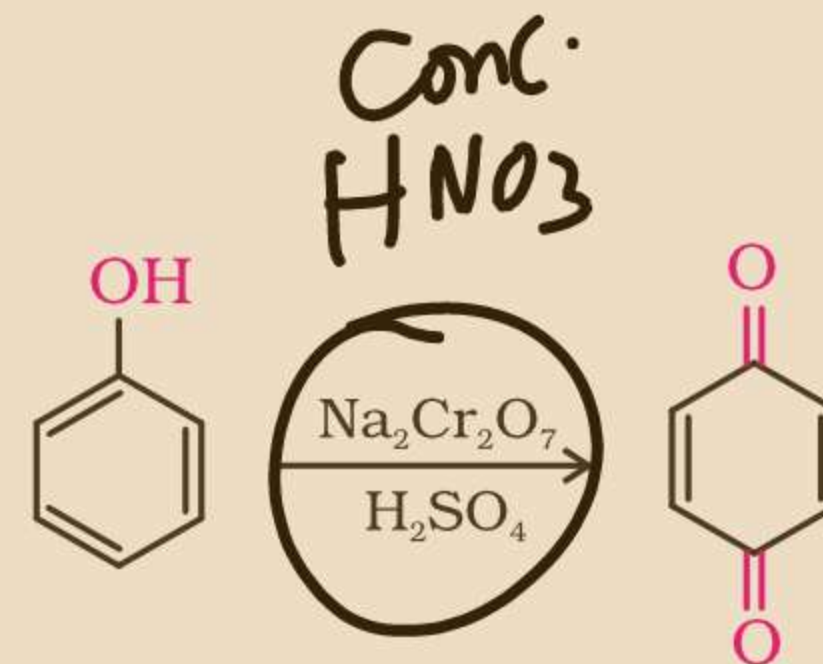
## Intermediate

**4. Reaction of phenol with zinc dust**

Phenol is converted to benzene on heating with zinc dust.

**5. Oxidation**

Oxidation of phenol with chromic acid produces a conjugated diketone known as benzoquinone. In the presence of air, phenols are slowly oxidised to dark coloured mixtures containing quinones.



benzoquinone

Intext Questions

**11.6** Give structures of the products you would expect when each of the following alcohol reacts with (a) HCl - ZnCl<sub>2</sub> (b) HBr and (c) SOCl<sub>2</sub>.

(i) Butan-1-ol

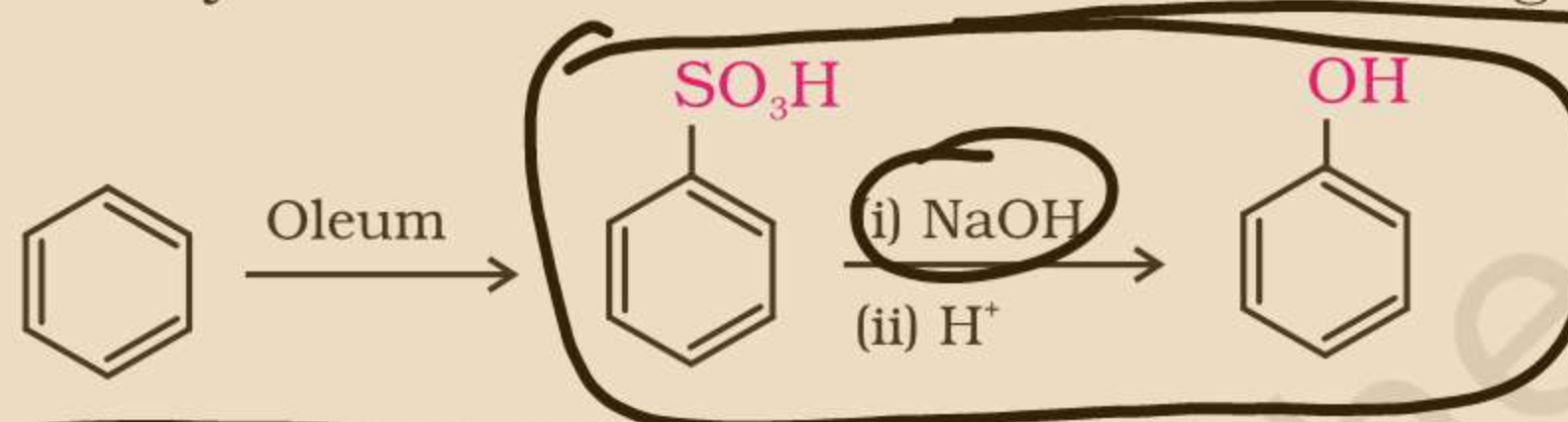
(ii) 2-Methylbutan-2-ol





## 2. From benzenesulphonic acid

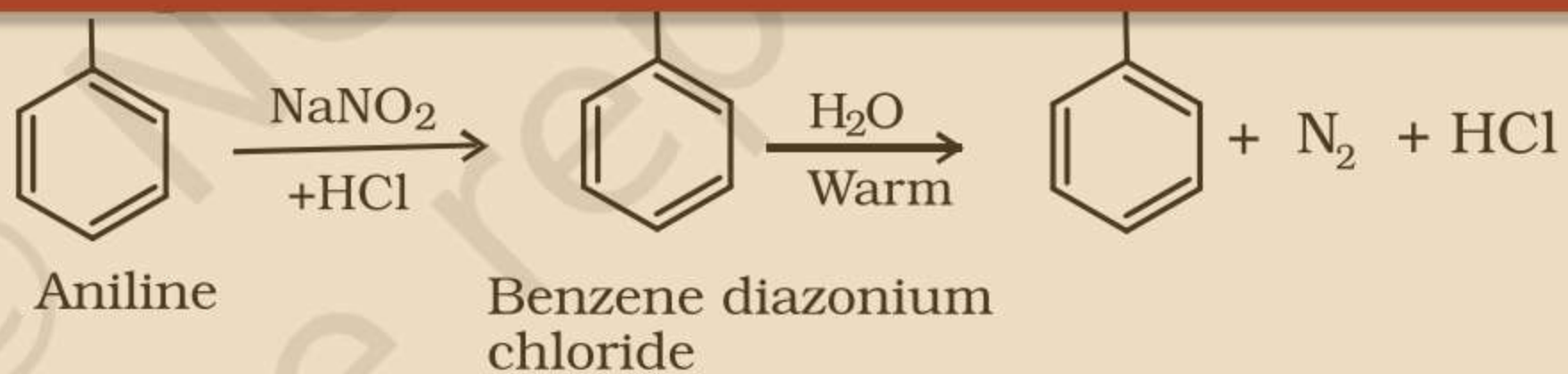
Benzene is sulphonated with oleum and benzene sulphonic acid so formed is converted to sodium phenoxide on heating with molten sodium hydroxide. Acidification of the sodium salt gives phenol.



## 3. From diazonium salts

A diazonium salt is formed by treating an aromatic primary amine with nitrous acid ( $\text{NaNO}_2 + \text{HCl}$ ) at 273-278 K. Diazonium salts are hydrolysed to phenols by warming with water or by treating with dilute acids (Unit 13, Class XII).

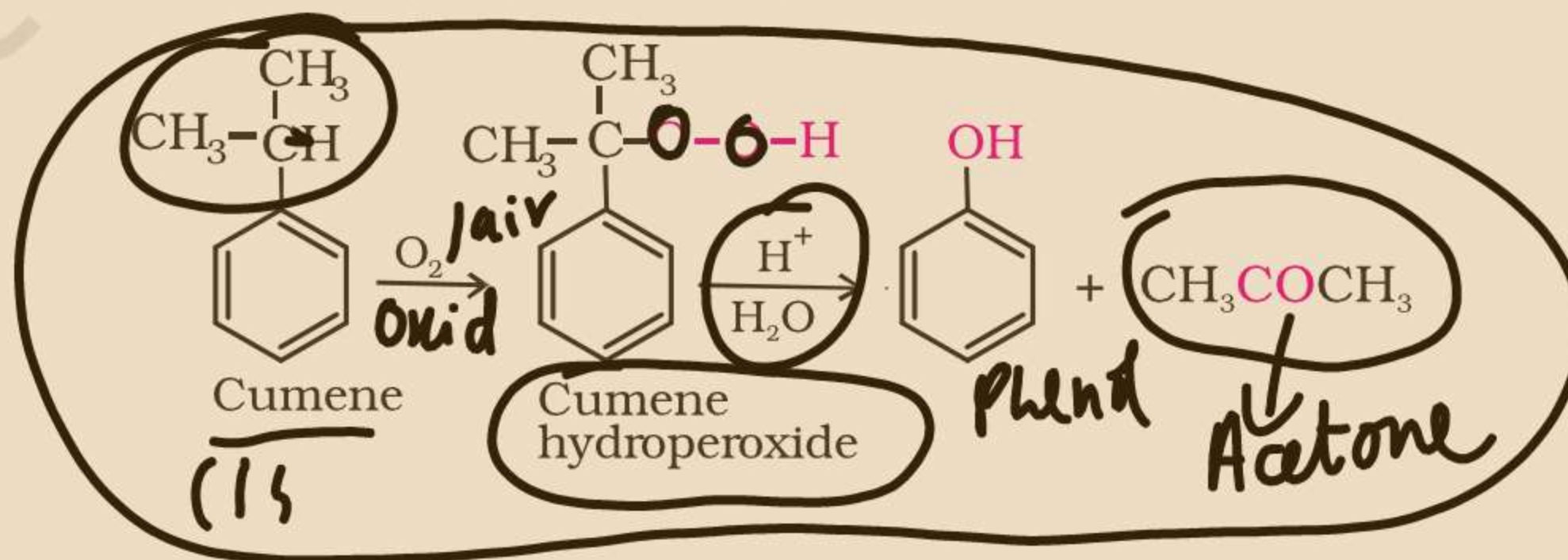




Most of the worldwide production of phenol is from cumene.

#### 4. From cumene

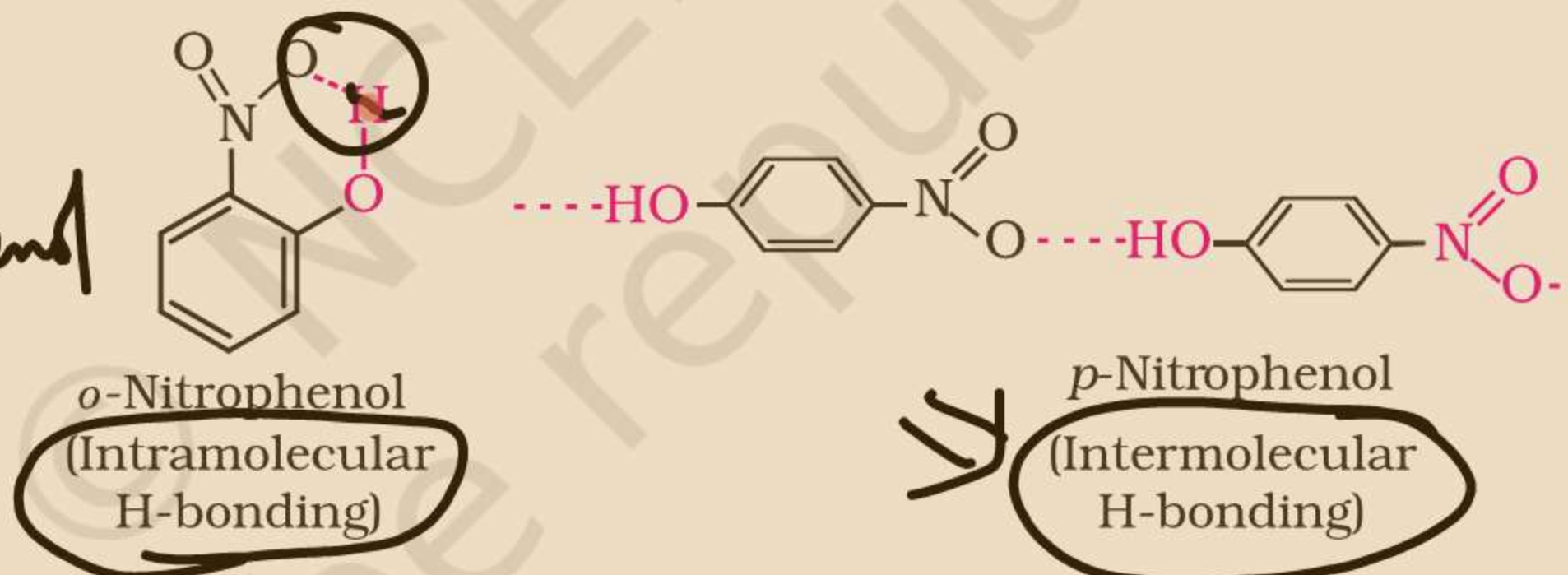
Phenol is manufactured from the hydrocarbon, cumene. Cumene (isopropylbenzene) is oxidised in the presence of air to cumene hydroperoxide. It is converted to phenol and acetone by treating it with dilute acid. Acetone, a by-product of this reaction, is also obtained in large quantities by this method.



*p*-Nitrophenol

The *ortho* and *para* isomers can be separated by steam distillation. *o*-Nitrophenol is steam volatile due to intramolecular hydrogen bonding while *p*-nitrophenol is less volatile due to intermolecular hydrogen bonding which causes the association of molecules.

B.P  
*p*-Nitrophenol >  
*o*-Nitrophenol



2, 4, 6 - Trinitrophenol is a strong acid due to the presence of three electron withdrawing  $-NO_2$  groups which facilitate the release of hydrogen ion.

With concentrated nitric acid, phenol is converted to 2,4,6-trinitrophenol. The product is commonly known as picric acid. The yield of the reaction product is poor.

