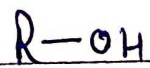
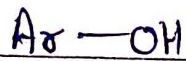


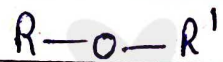
ALCOHOLS, PHENOLS & ETHERS



Alcohol



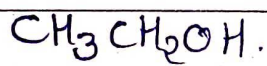
phenol



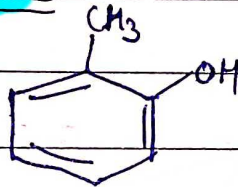
Ether

Alcohol:-

⇒ Monohydric Alcohols



Ethanol

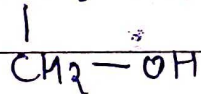


(o-cresol)
2-methyl Phenol



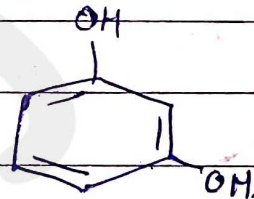
Phenol

⇒ Dihydric Alcohol



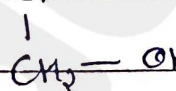
(Ethylene glycol)

Ethan-1,2-diol



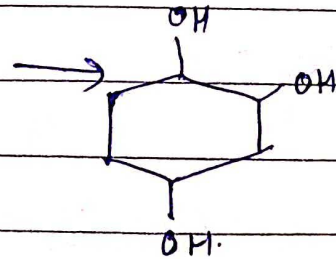
Benzene 1,3-diol.

⇒ Trihydric

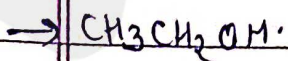


(Glycerol)

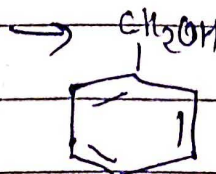
Propane-1,2,3-triol



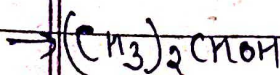
Benzene 1,2,4-triol



Ethanol (1°)



Phenyl methanol (1°)



Propan-2-ol (2°)



Phenyl ethanol (2°)

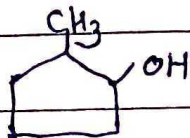
⇒ IUPAC Nomenclature

①



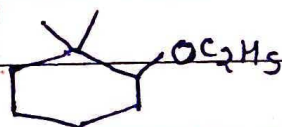
cyclohexanol

②



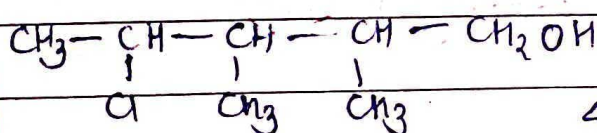
2-Methyl Cyclopentanol

③



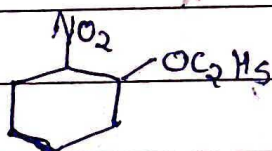
2-Ethoxy-1,1-Dimethyl cyclohexane

④



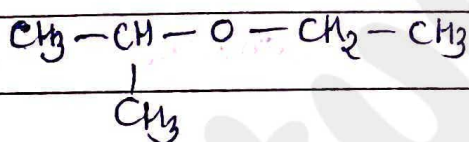
4-chloro-2,3-dimethyl pentanol

⑤



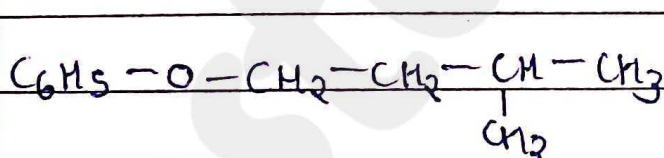
1-Ethoxy 2-Nitrocyclohexane

⑥



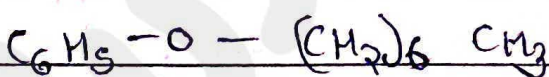
2-Ethoxypropane.

⑦



3-Methylbutoxybenzene

⑧

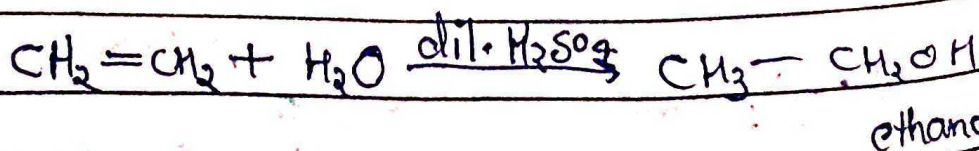


phenoxyheptane.

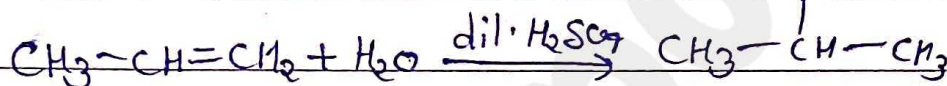
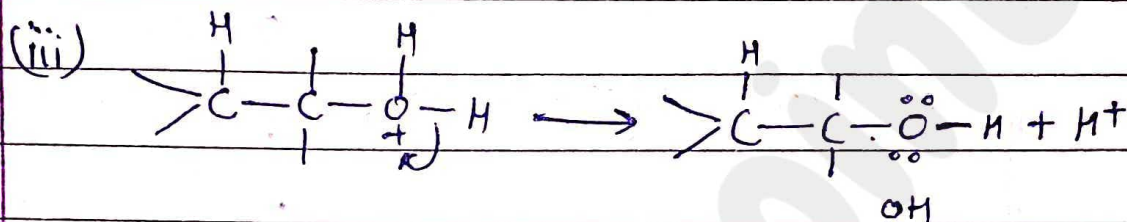
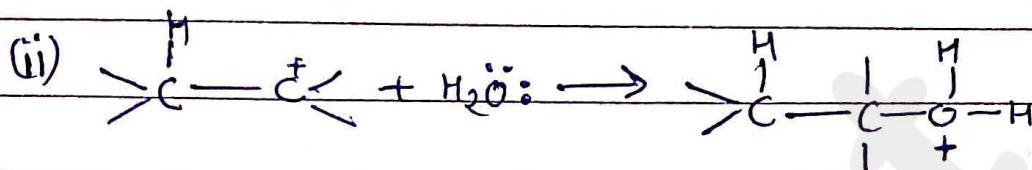
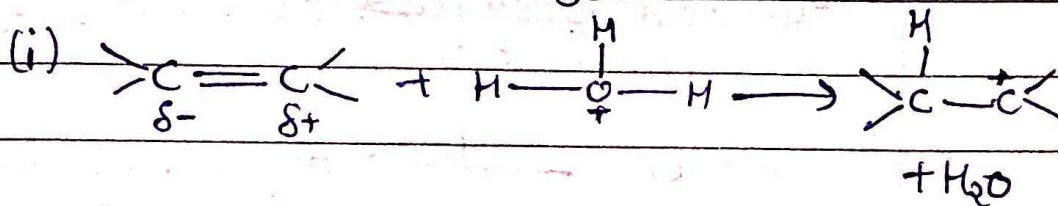
⇒ Preparation of Alcohol

① from Alkene

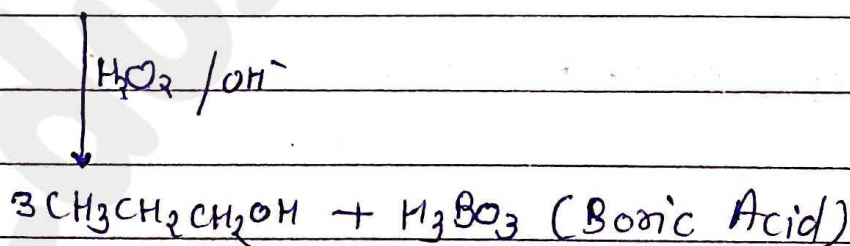
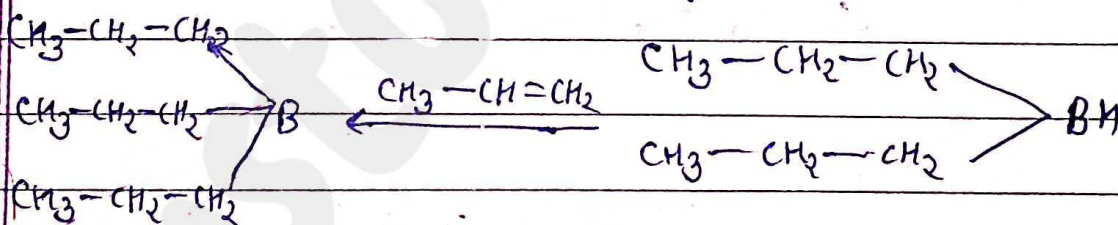
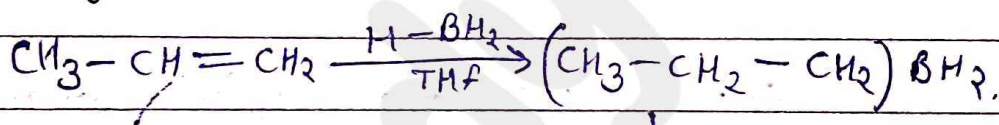
(a) By Acid Catalysed hydration →



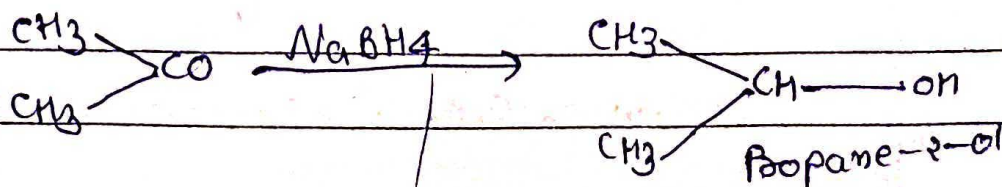
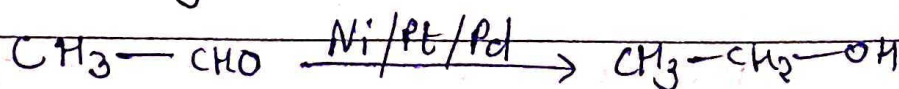
Imp Mechanism



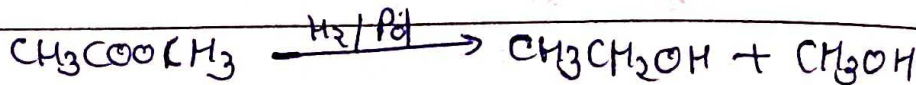
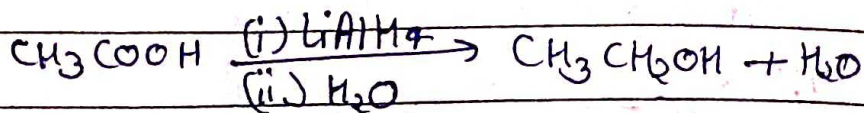
(b) by hydroboration oxidation



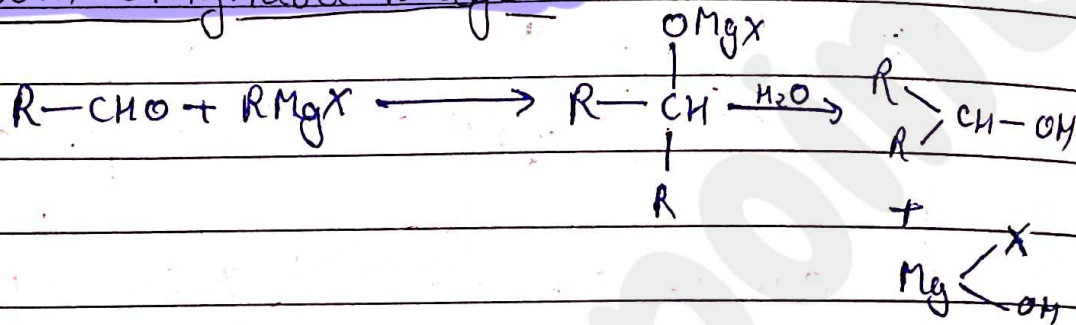
② from Aldehyde & ketone.



③ from Carboxylic Acid & Ester



④ from Grignard Reagent :-



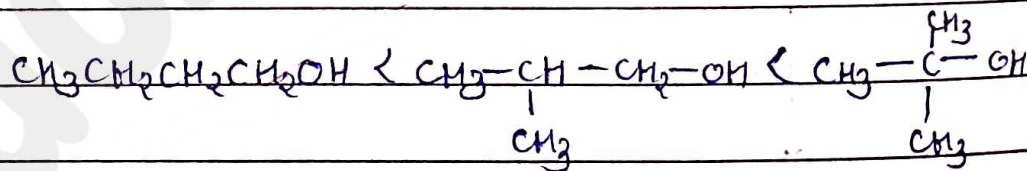
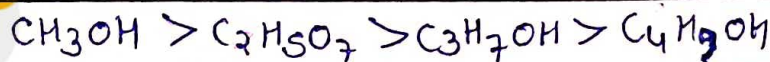
⇒ Physical properties :-

① Physical State :-

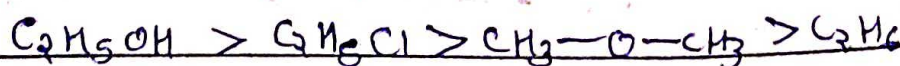
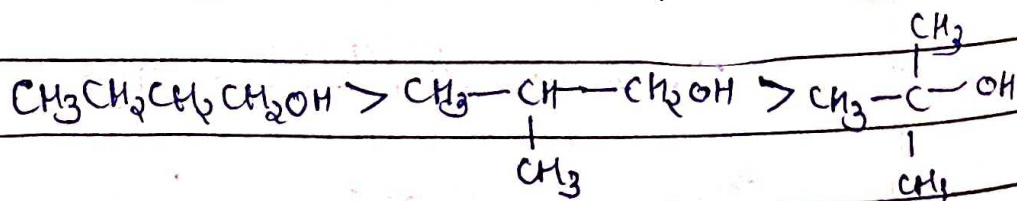
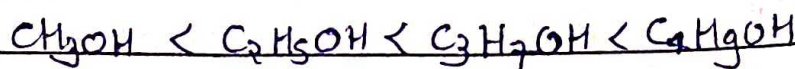
C₁ to C₁₁ are Colourless, Sweet Smelling, mobile liquid

C₁₁ to Onwards are waxy Solid.

② Solubility :-



③ Boiling point :-

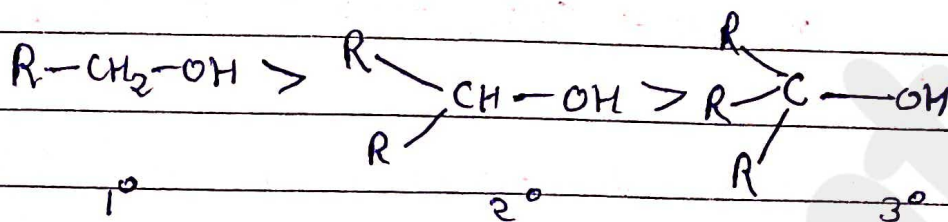




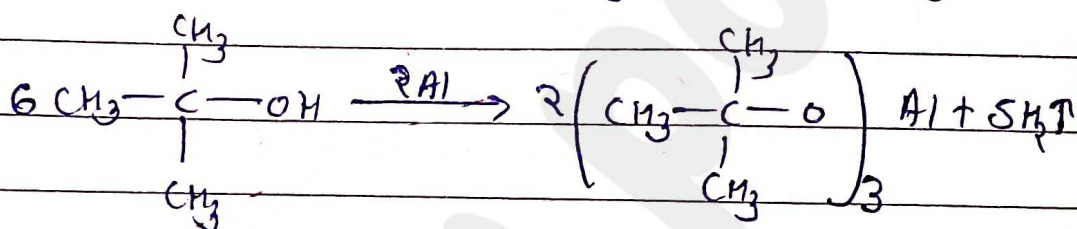
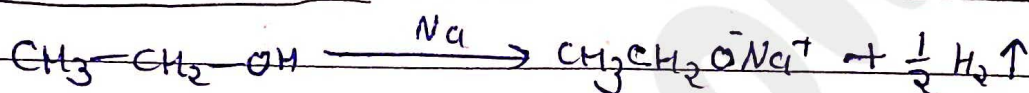
Chemical properties

(1) Reaction involving cleavage of O-H Bond

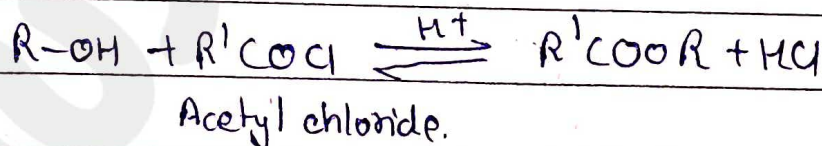
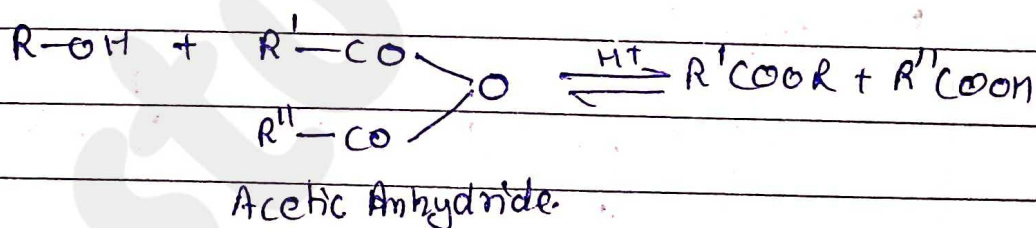
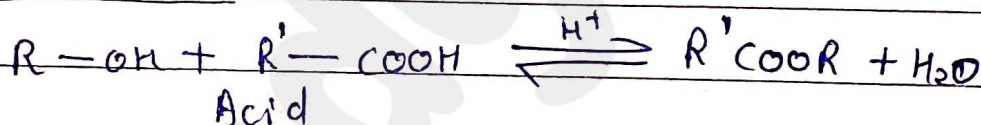
Acidity of Alcohol



(a) Reaction with metal

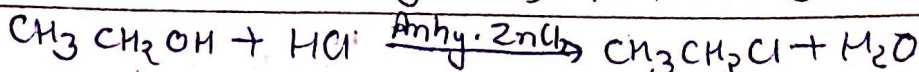
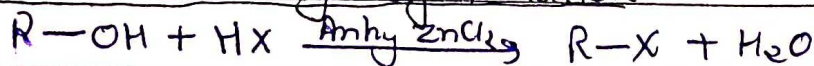


(b) Esterification



(2) Reaction involved cleavage of C-O bond

(a) Reaction with hydrogen halide

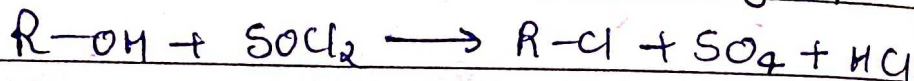
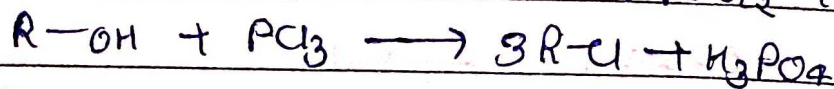
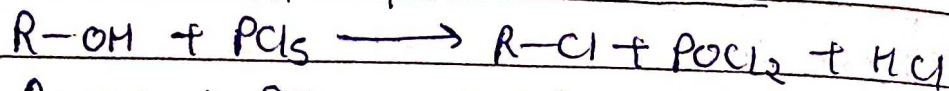


if turbidity appear immediately :- 3° alcohol

if turbidity appear within 5min :- 2° Alcohol

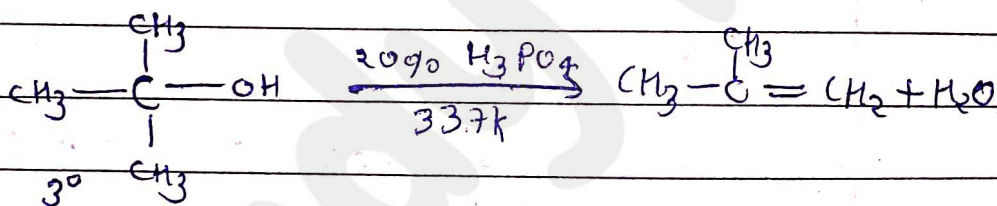
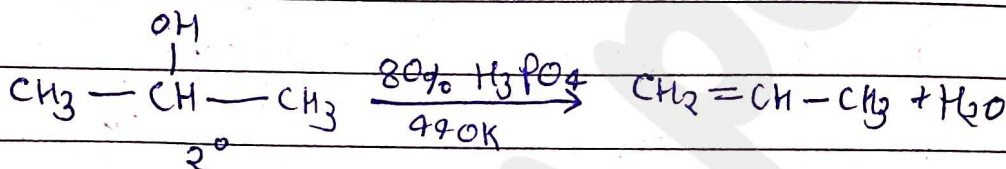
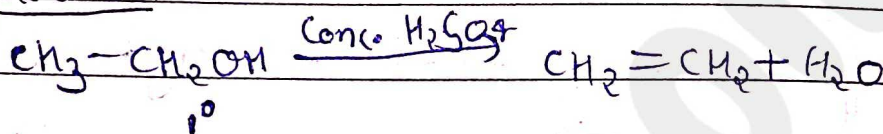
if turbidity appears only upon heating :- 1° Alcohol

(b) Reaction with phosphorous halide:

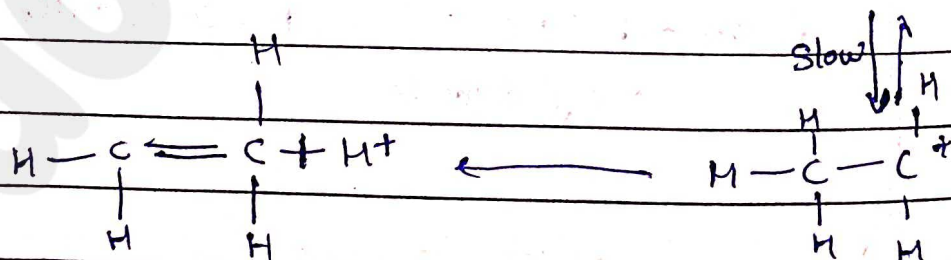
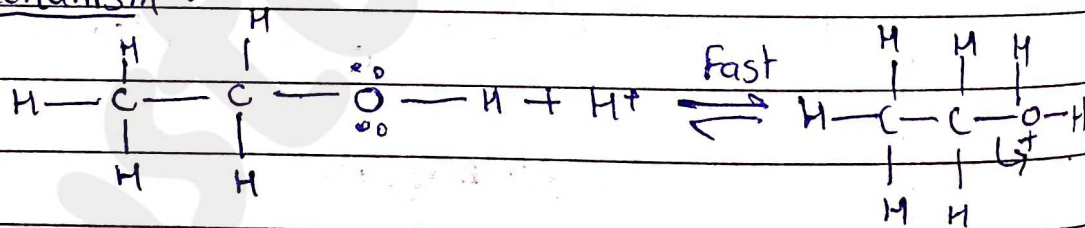


(3) Reaction involving cleavage of Alkyl as well as hydroxyl group.

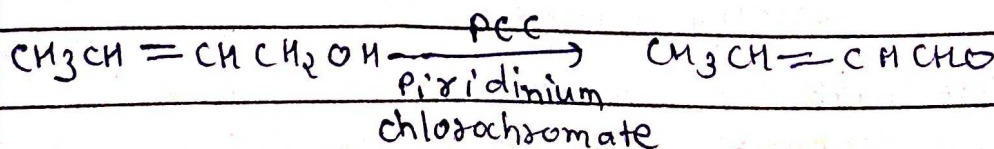
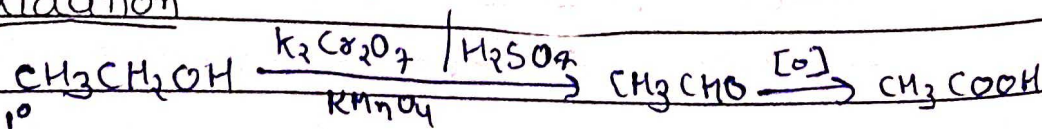
(a) Dehydration

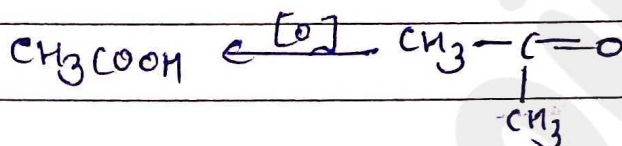
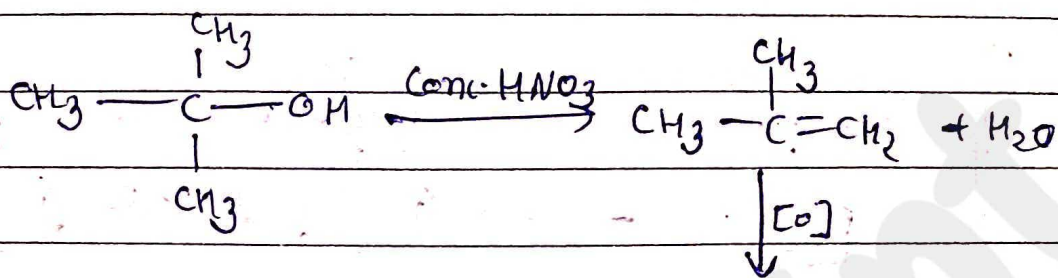
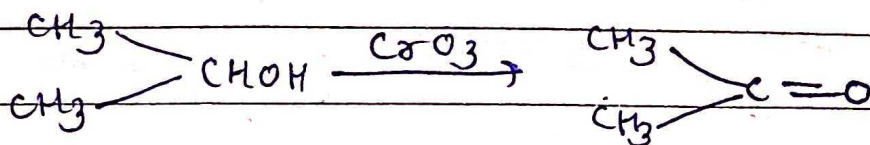
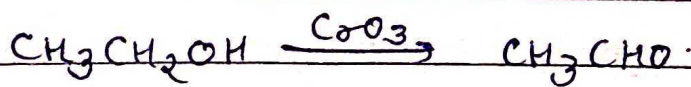


Mechanism :-

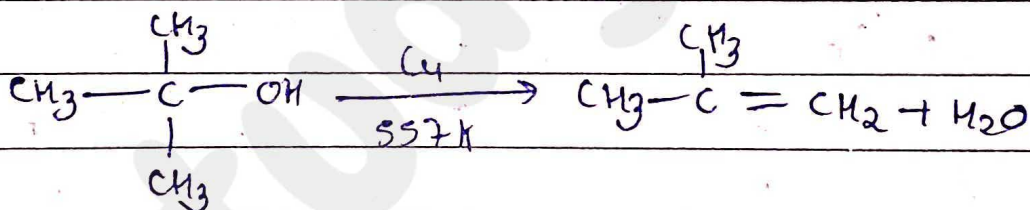
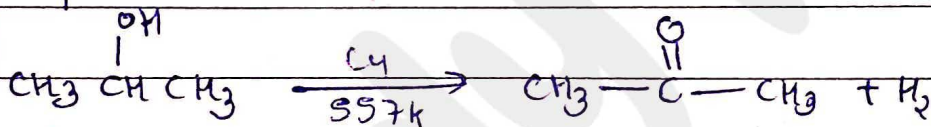
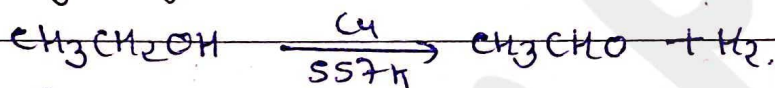


(b) Oxidation



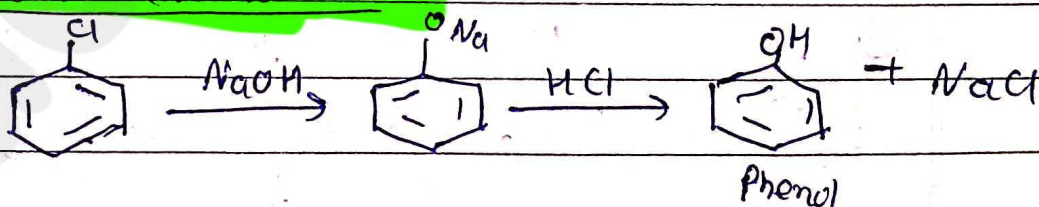


③ Dehydrogenation:

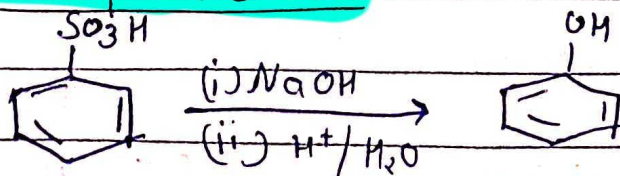


⇒ Preparation of phenols:

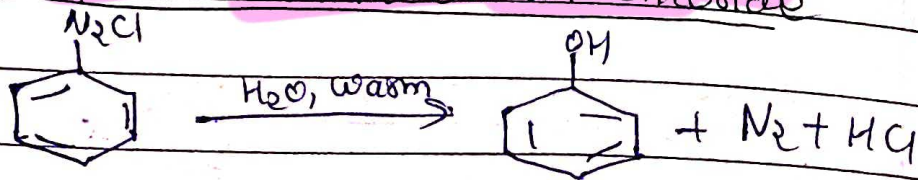
① from Halobenzenes:



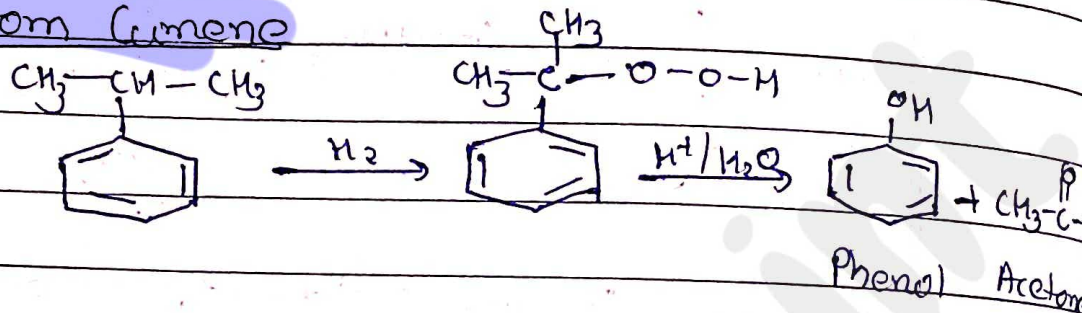
② from Sulphonic Acid:



③ From Benzene Diazonium chloride

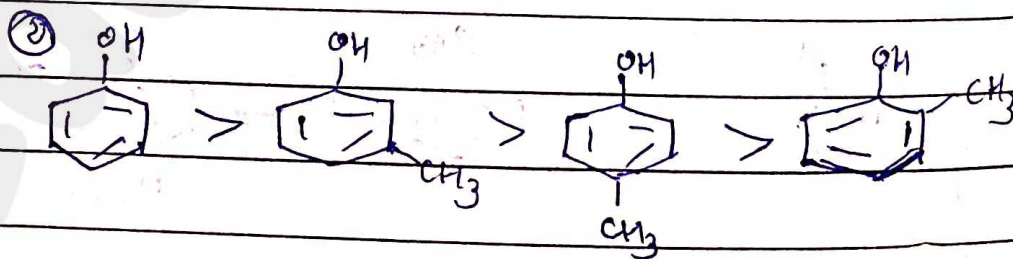
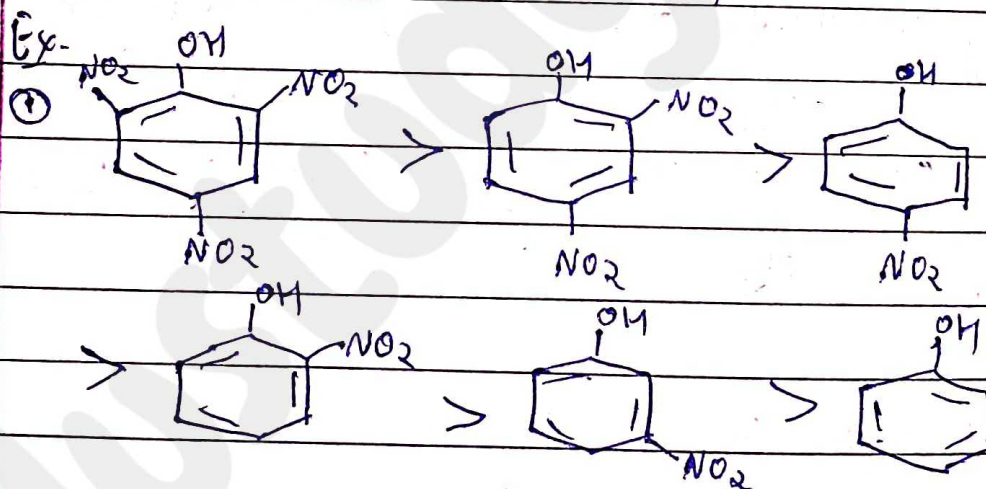
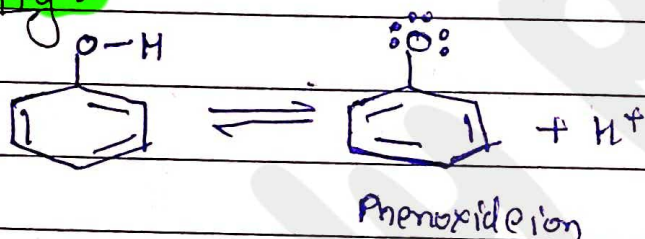


④ From Cumene

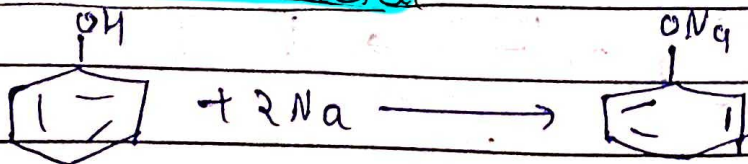


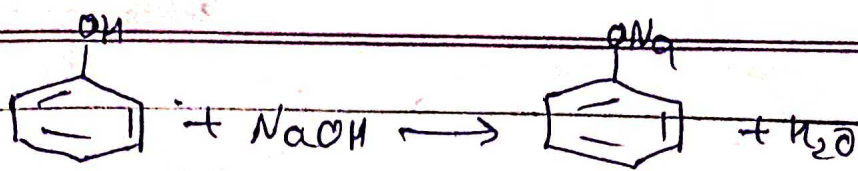
⇒ Chemical properties :-

① Acidity :-

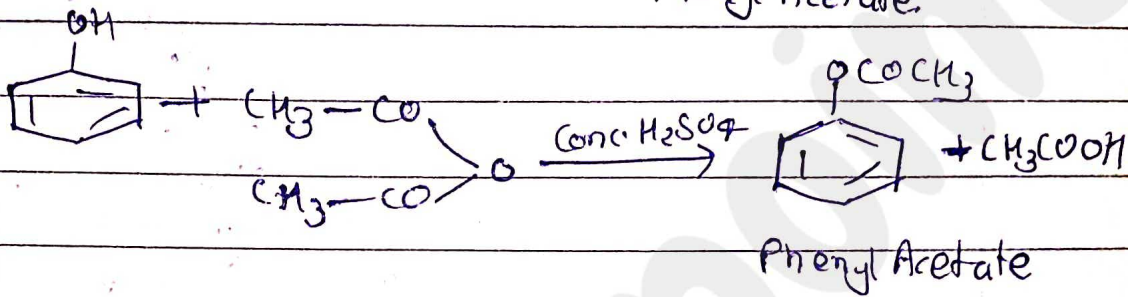
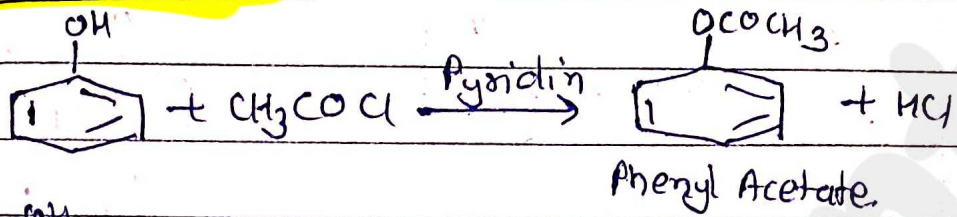


② Reaction with metal :-

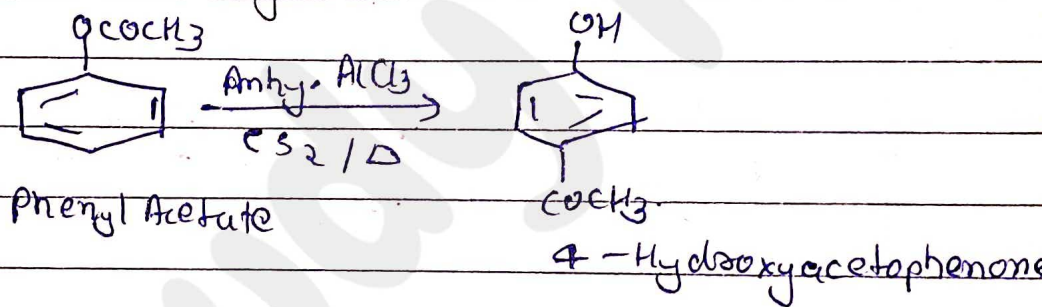




③ Esterification :-

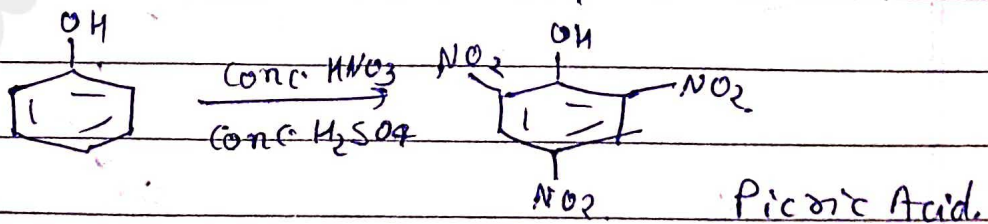
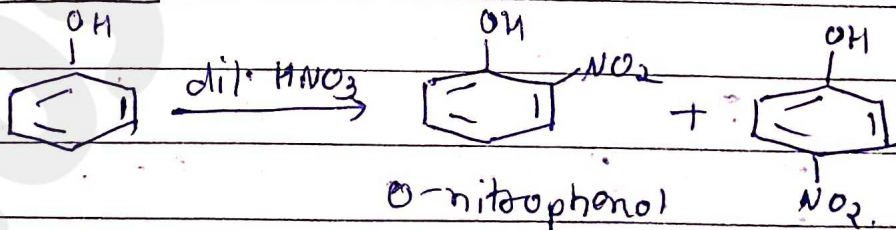


(i) Fries Rearrangement

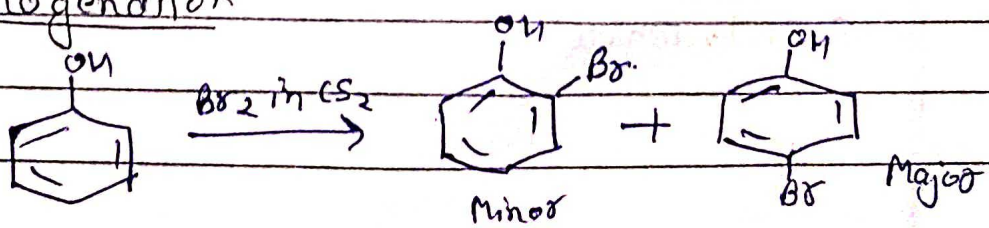


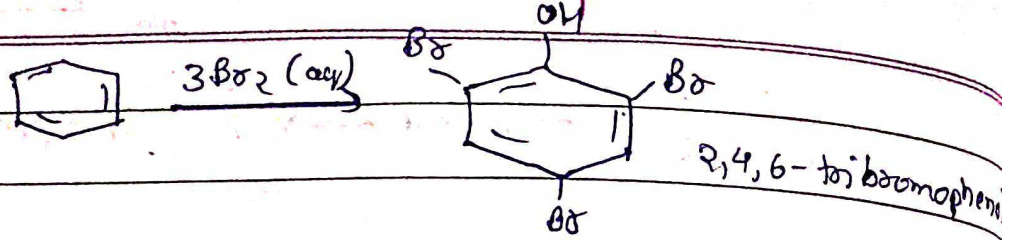
④ Electrophilic Substitution

(a) Nitration

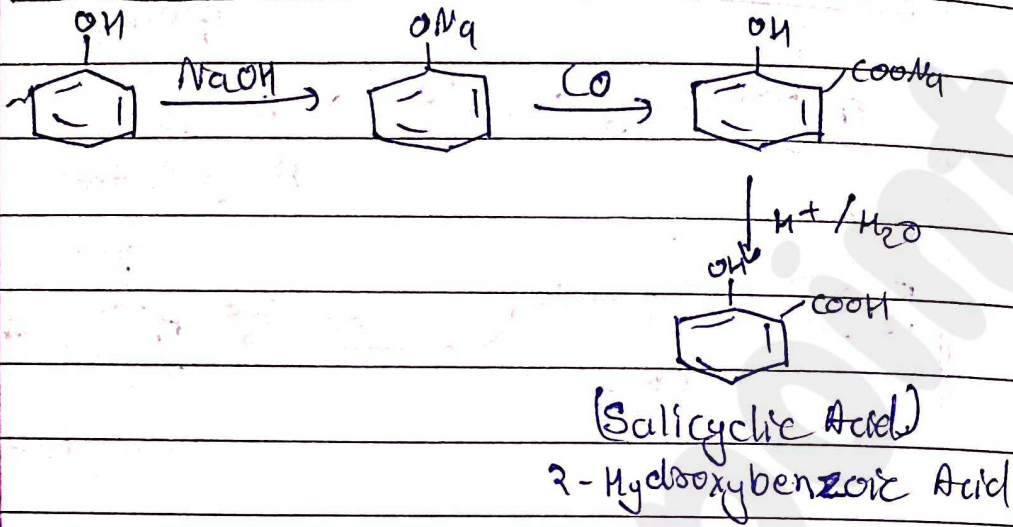


(b) Halogenation

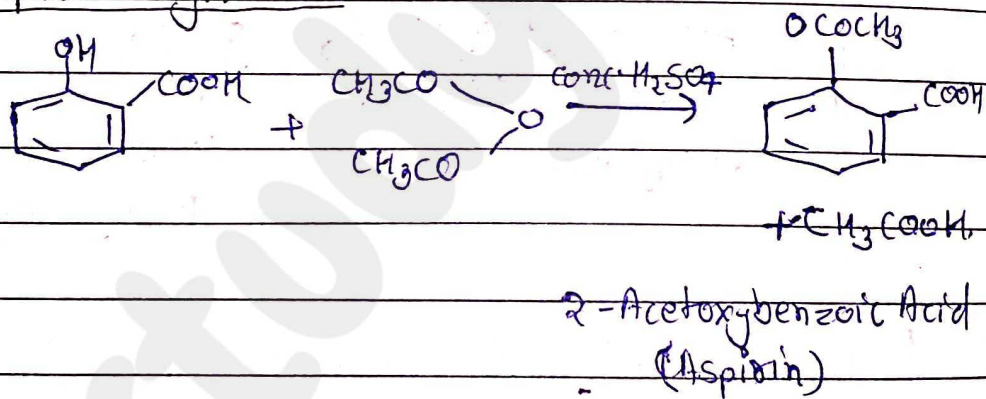




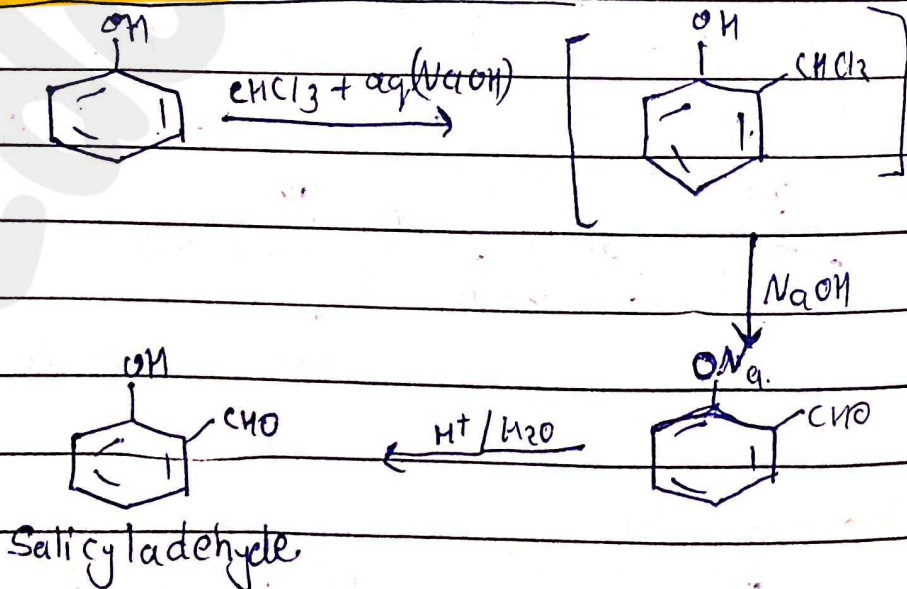
⑤ Kolbe's Reaction:



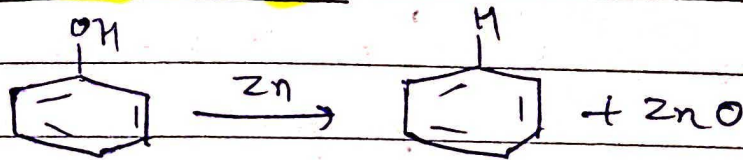
Aspirin Synthesis



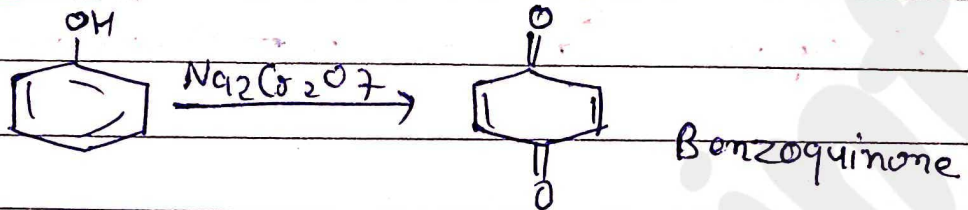
⑥ Reimer Tiemann Reaction



⑦ Reaction with Zn



⑧ Oxidation



⇒ Some Important Compounds of Alcohol -

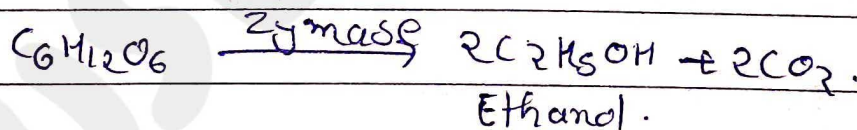
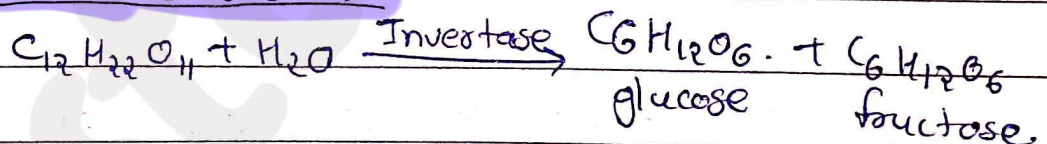
① Methanol (CH_3OH)



Uses → it is also known as wood spirit. it is very toxic in nature.

- used as a solvent in paint, varnish & for formation of formaldehyde.

② Ethanol ($\text{C}_2\text{H}_5\text{OH}$)



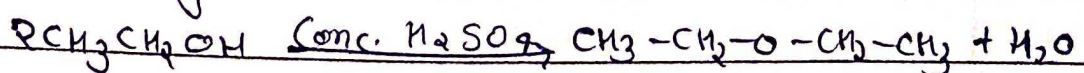
Uses → it is used in paint industry. used in preparation of no. of Carbon Compounds.

- In wine making.

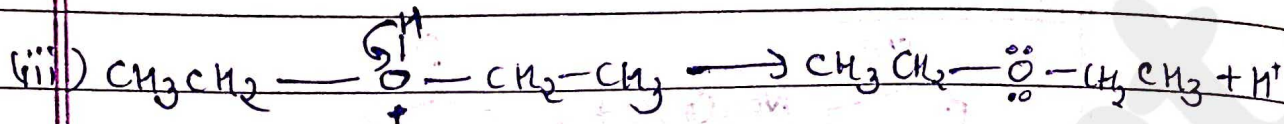
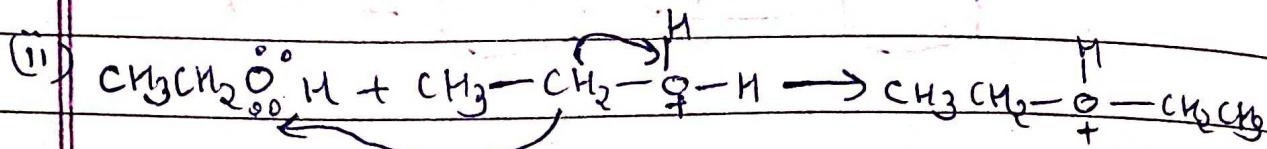
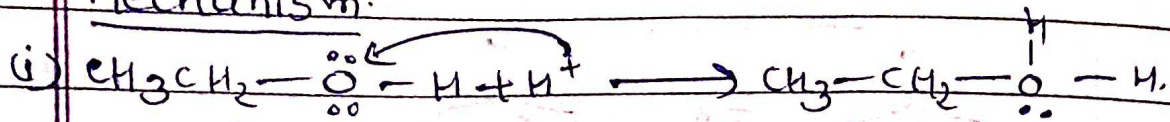
Ether

⇒ Preparation of Ether

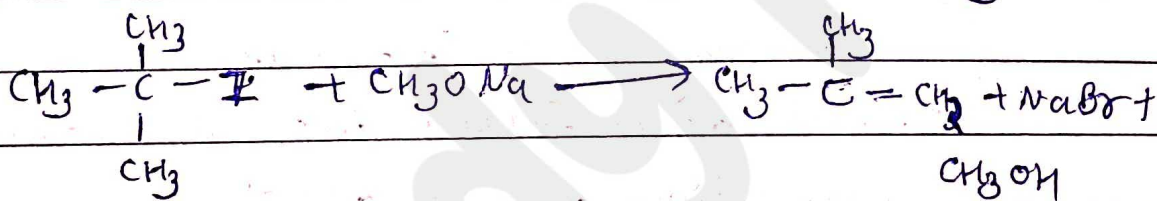
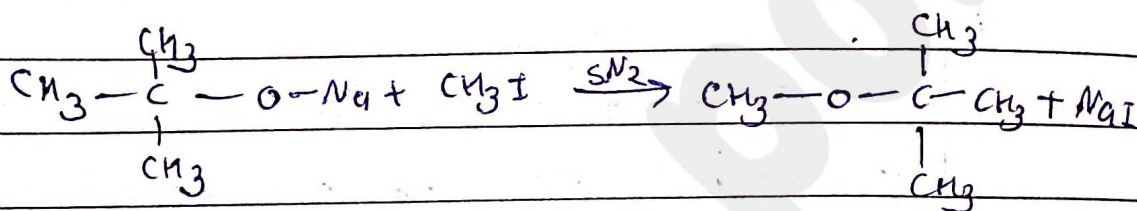
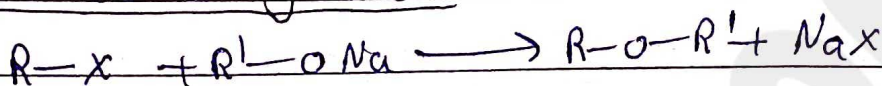
① from Dehydration of Alcohol



Mechanism.

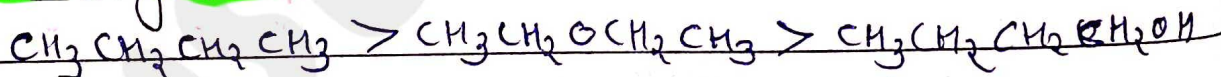


(2) Williamson's Synthesis:-



⇒ Physical properties

(1) Boiling point



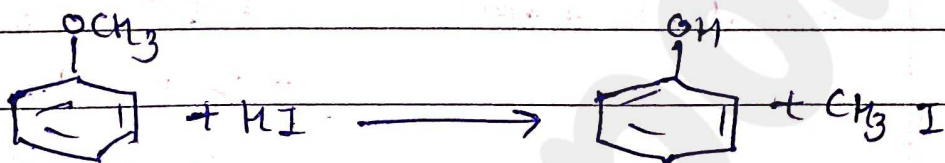
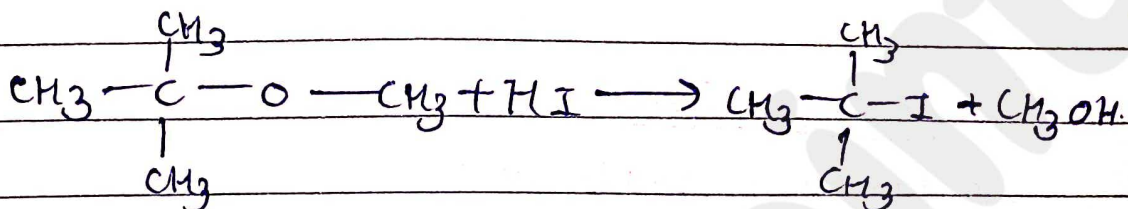
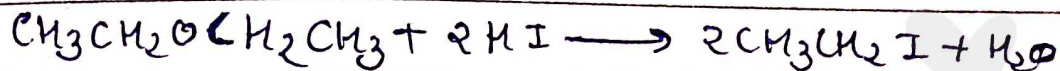
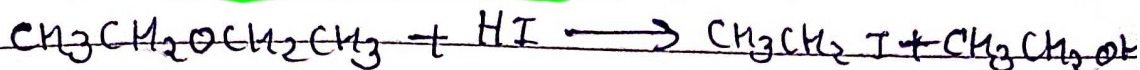
Due to presence of Hydrogen Bonding.

(2) Solubility:- The isomeric Alcohol & Ether are

Soluble in H_2O because of presence of Inter-molecular Hydrogen bond & Higher ether molecule are soluble in organic compound but not in H_2O .

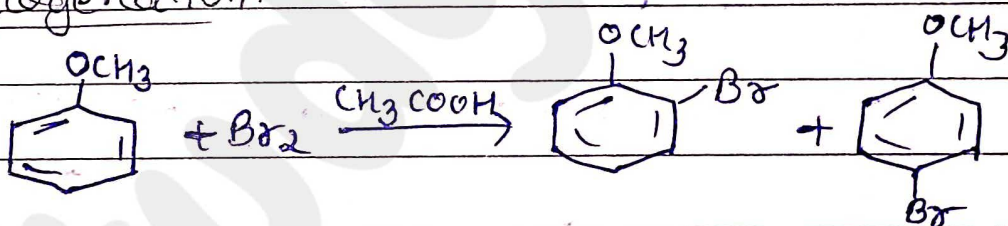
⇒ Chemical properties:-

① Cleavage of C-O bond

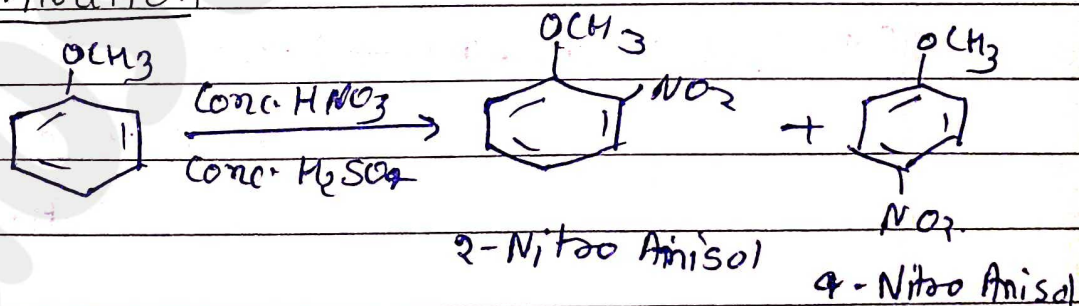


② Electrophilic Substitution Reaction:-

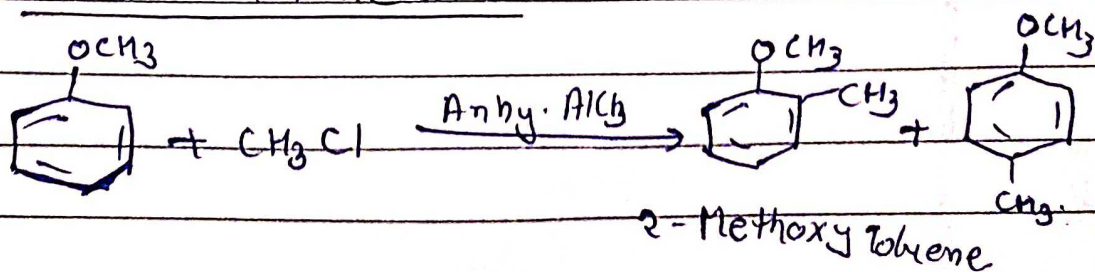
(a) Halogenation.

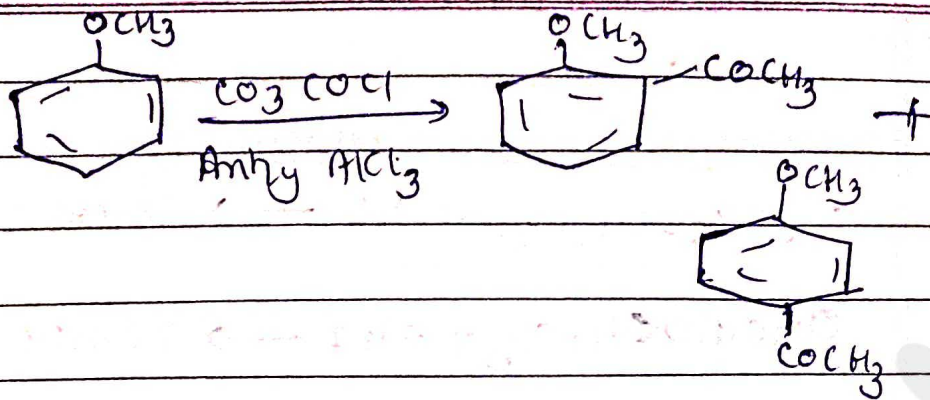


(b) Nitration



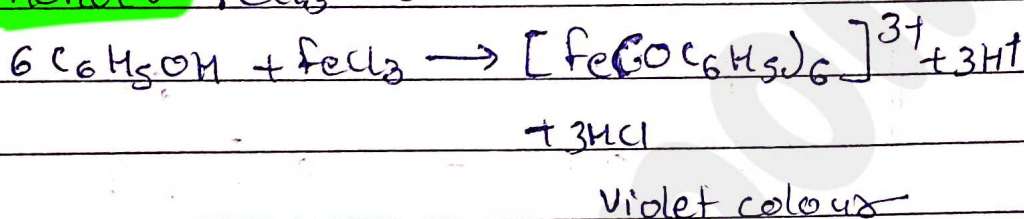
(c) Friedel Craft Reaction



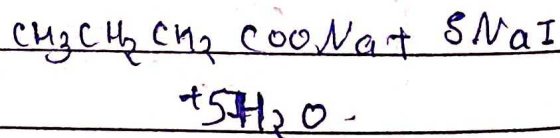
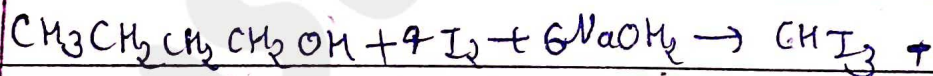
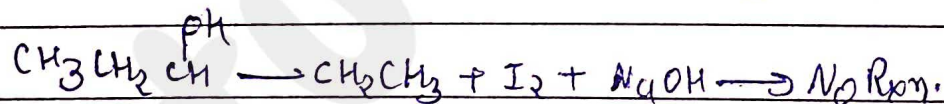
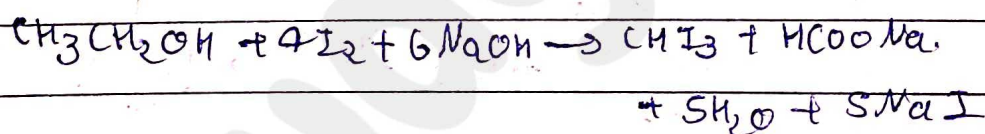


⇒ Chemical Test

→ Phenol :- FeCl_3 Test



→ Alcohol :- Iodoform test



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