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Where Minds Pollinate

Class 11
Chemistry

Chapter 18
Alcohol
Handwritten Notes

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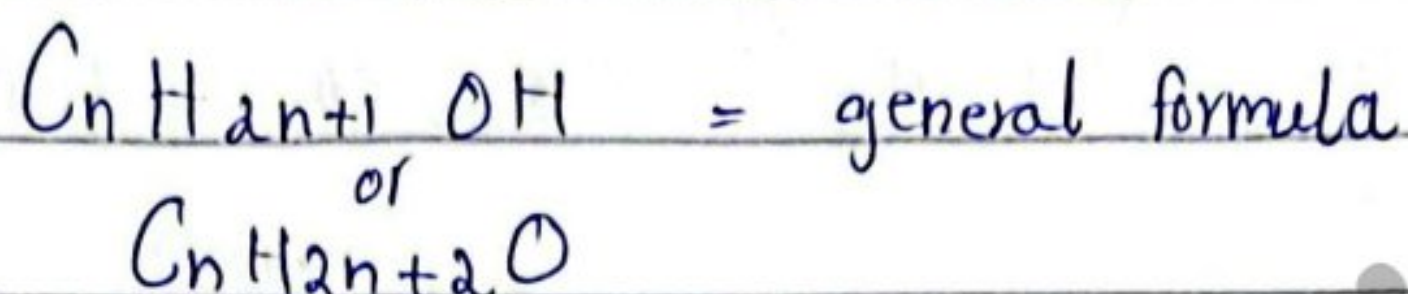
Chap: 18

Alcohols

Q. What are alcohols. How are they classified?

Alcohol

or Alkanols:- ($R-OH$) When hydrogen atom of alkane is replaced by hydroxyl group ($O-H$) compound formed are called alcohol.



Classification:- Monohydric Alcohols

Polyhydric Alcohols. ^{no further types}

Monohydric Alcohols:-

→ ① Alcohol containing only one OH group

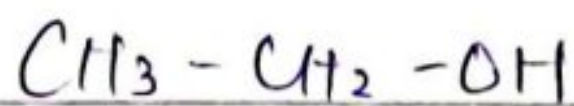
Types:-

- Primary alcohol (1° - ")
- Secondary alcohols (2° - ")
- Tertiary alcohols (3° - ")

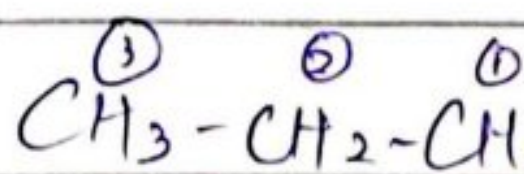
• **Primary Alcohol:-** (1° - ") Alcohol in which OH group is bonded with primary carbon.

Primary carbon :- Def

E.g.:



ethyl alcohol (C.N)
or ethanol (IUPAC)



Pri-propyl alcohol (C.N)
1-propanol (IUPAC)

• **Secondary Alcohol:-** (2° - ")

Secondary carbon :- Def

E.g:- $\text{CH}_3 - \underset{\text{OH}}{\text{CH}} - \text{CH}_3$ sec - propyl alcohol (C.N)
 or
 iso propyl alcohol (C.N)
 or
 2 - propanol (IUPAC)

(3° - ")
 Tertiary alcohol:- Def:-

Tertiary carbon:- Def:-

E.g:- $\text{CH}_3 - \text{CH}_2 - \underset{\text{OH}}{\overset{\text{CH}_3}{\text{C}}} - \text{CH}_3$ Ter - pentyl alcohol
 or
 2-Methyl - 2-butanol

Polyhydric :- Alcohols containing more than one
 OH group in their structure are called
 polyhydric alcohol.

E.g:- $\text{CH}_2 - \underset{\text{OH}}{\text{CH}} - \underset{\text{OH}}{\text{CH}_2}$ 1, 2-Ethanediol
 glycol or ethylene glycol

$\text{CH}_2 - \underset{\text{OH}}{\text{CH}} - \underset{\text{OH}}{\text{CH}_2}$ 1, 2, 3 - propanetriol
 Glycerine or glycerol

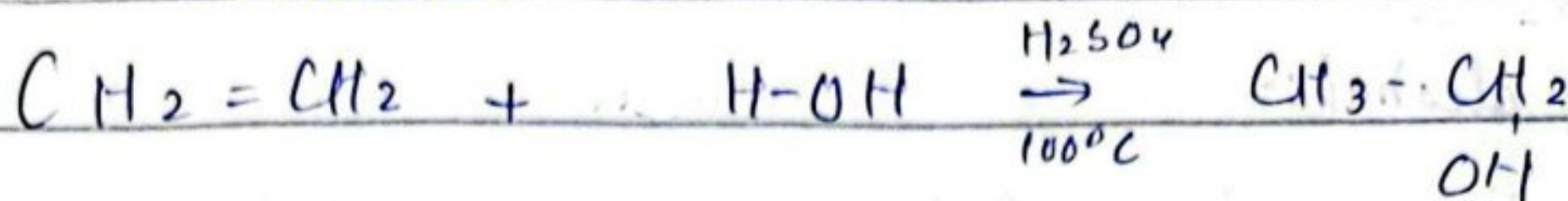
$\text{CH}_2 - \underset{\text{OH}}{\text{CH}} - \underset{\text{OH}}{\text{CH}_2} - \text{CH}_3$ Butylene glycol

$\text{CH}_2 - \underset{\text{OH}}{\text{CH}} - \underset{\text{OH}}{\text{CH}_3}$ propylene glycol

Method of preparation of Alcohols:-

① Hydration of alkene or Electrophilic

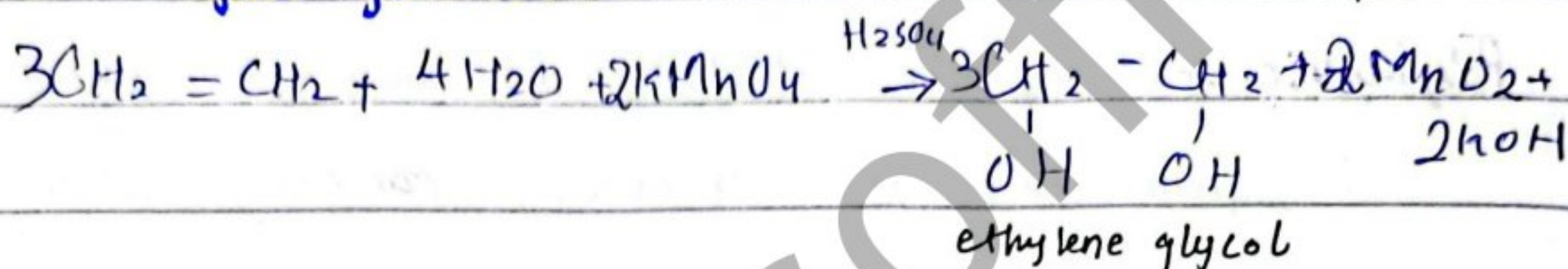
Addition:-



② Reaction of alkene with KMnO_4 or

potassium manganate(VII) $\nearrow$

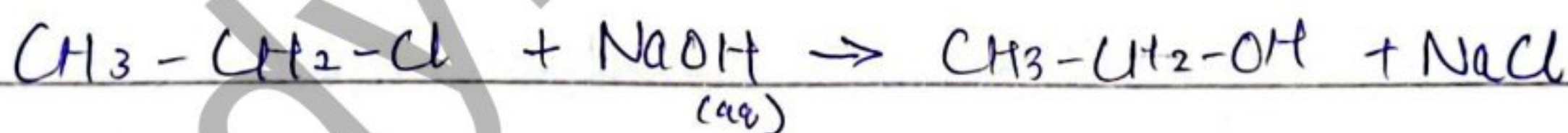
Hydroxylation:-



Also known as Baeyer's reagent:-

③ Reaction of alkyl halide with aq. NaOH :-

Nucleophilic substitution of haloalkanes:-



④ Reduction of Carbonyl compound:- (Aldehyde or ketone)

Aldehydes $\Rightarrow$ pri - alcohol

ketone $\Rightarrow$ sec - alcohol

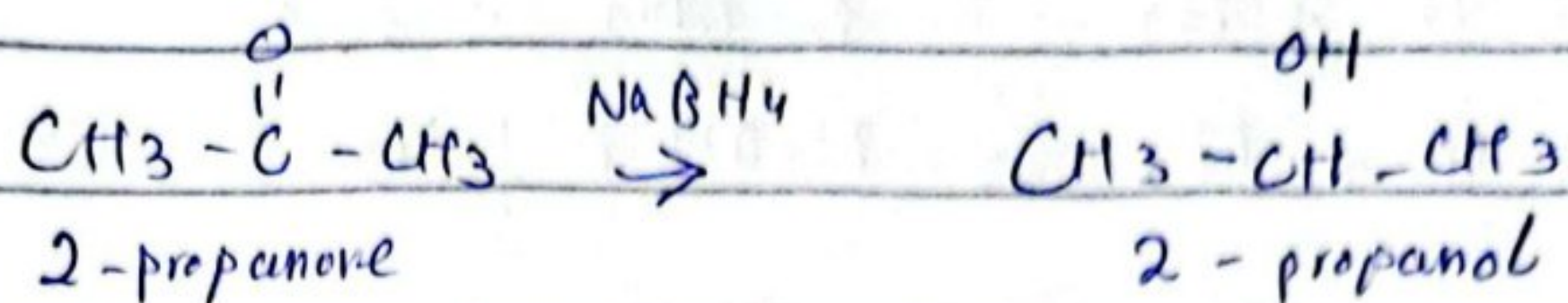
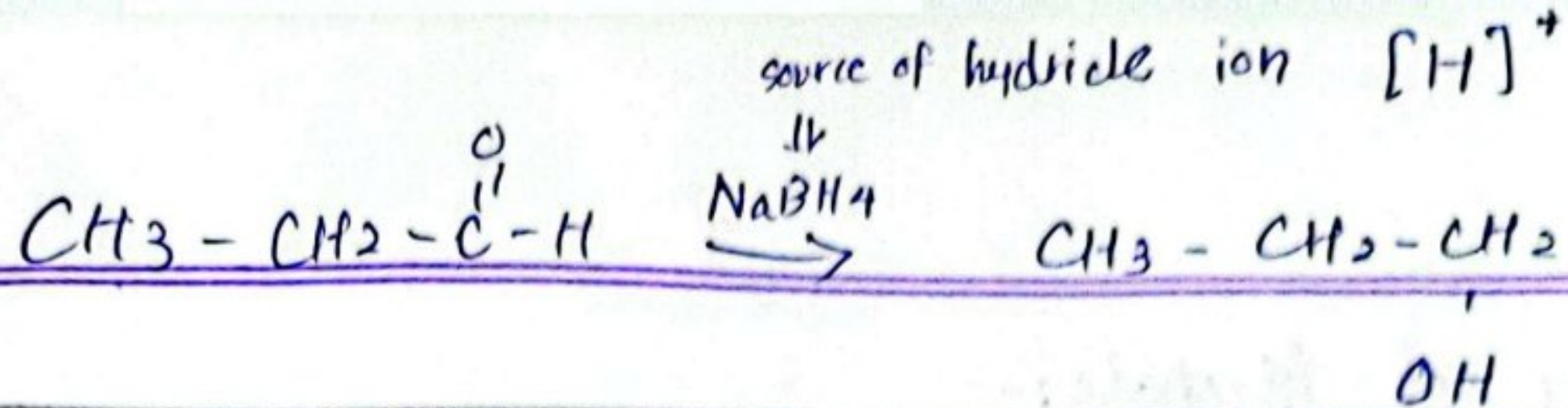
Reducing agent:- NaBH_4

Sodium borohydride

LiAlH_4

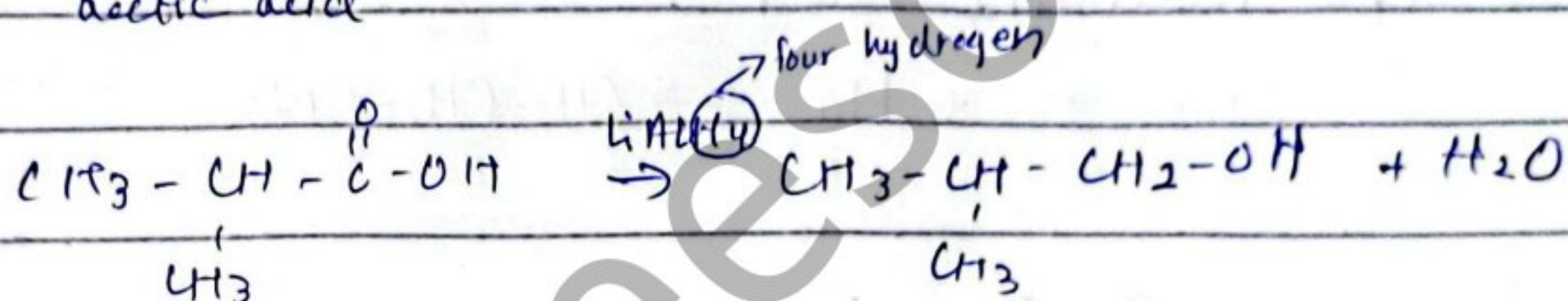
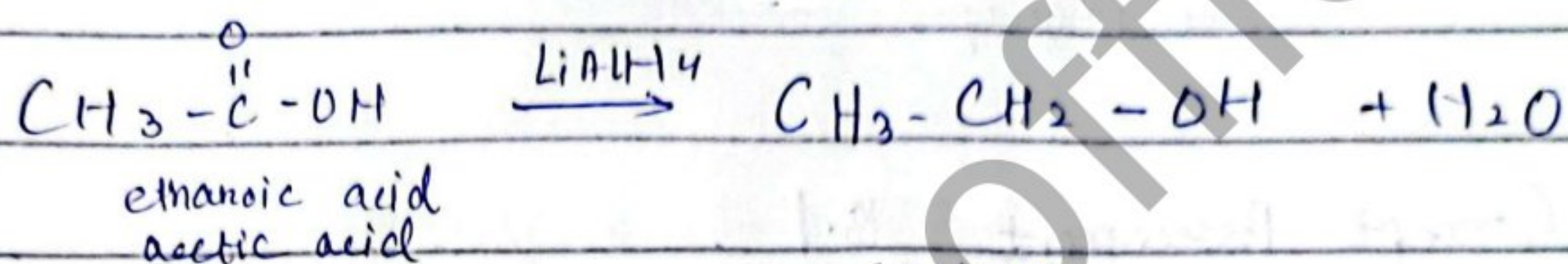
Lithium aluminum hydride

more strong
 $\uparrow$

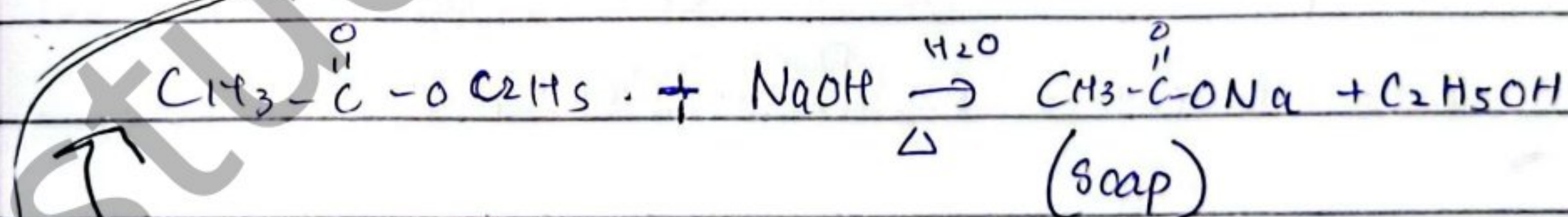
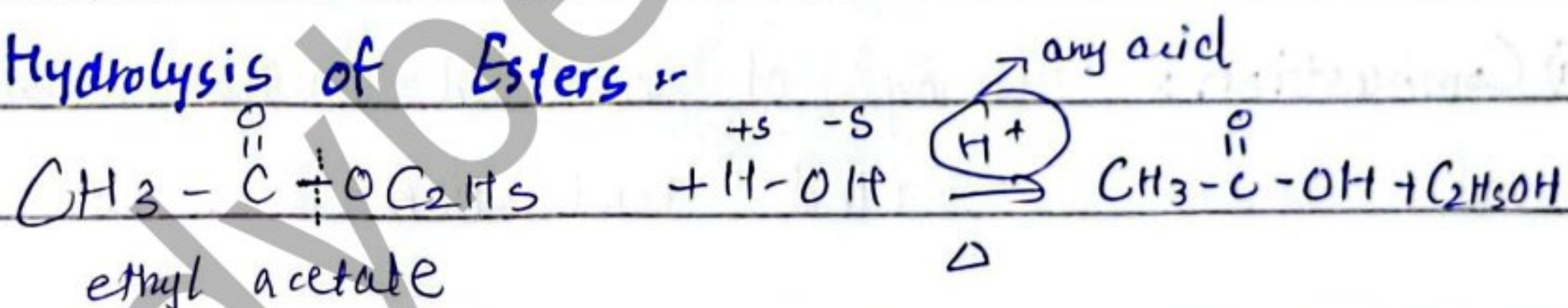


⑤ Reduction of carboxylic acid:-

[carboxylic acid reduce to pri-alcohol]

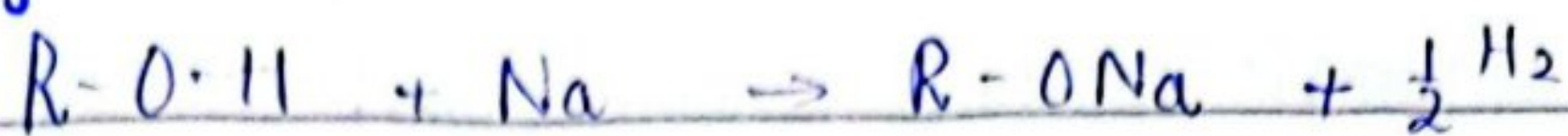


⑥ Hydrolysis of Esters:-

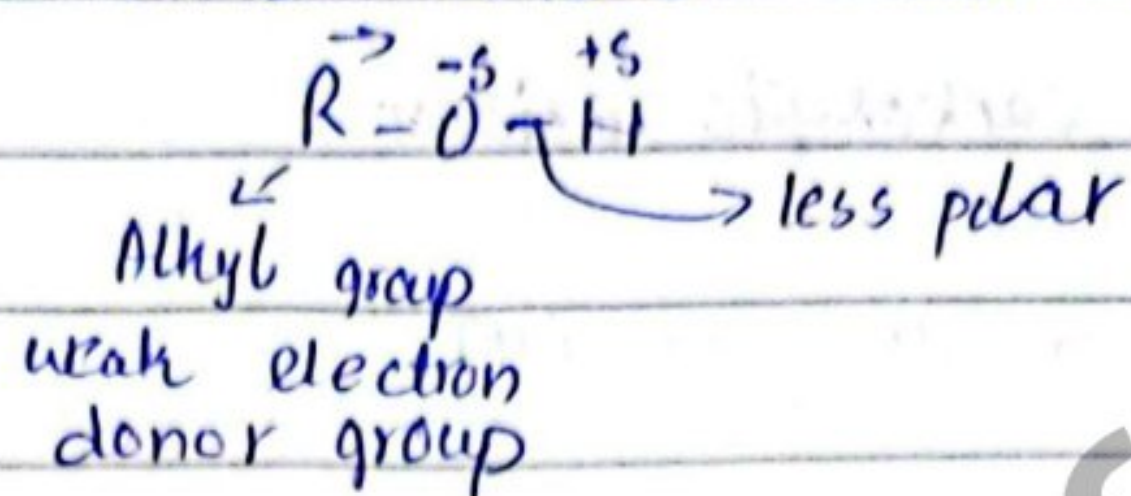


also called **saponification**

Acidity of Alcohols:-



Water is more acidic than alcohol.

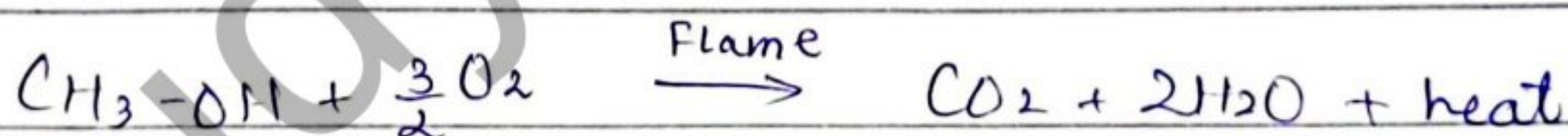


Concept Assessment 18.1

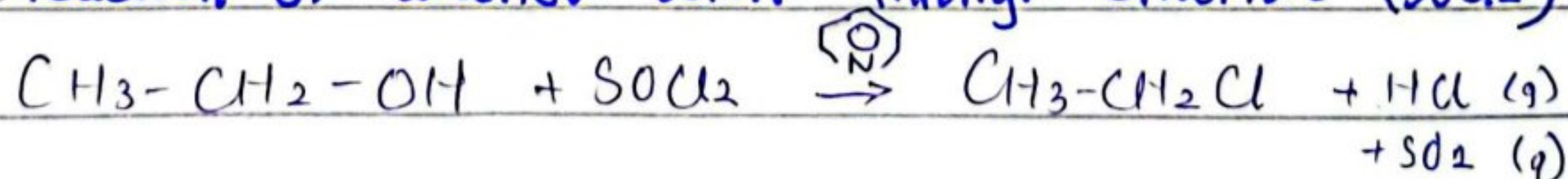


Reaction of Alcohols:-

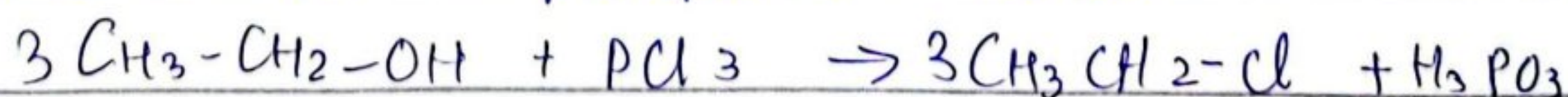
1) **Combustion:-** Burning of compound in the presence of oxygen is called combustion.



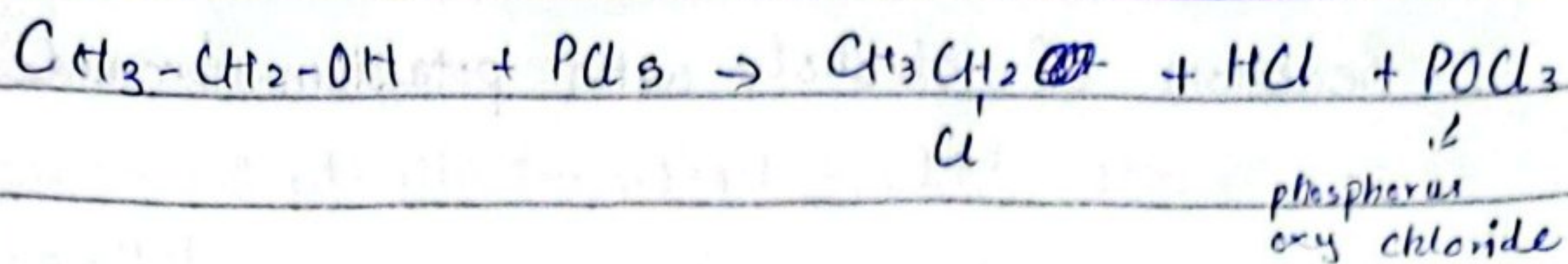
2) **Reaction of alcohol with thionyl chloride ($SOCl_2$):-**



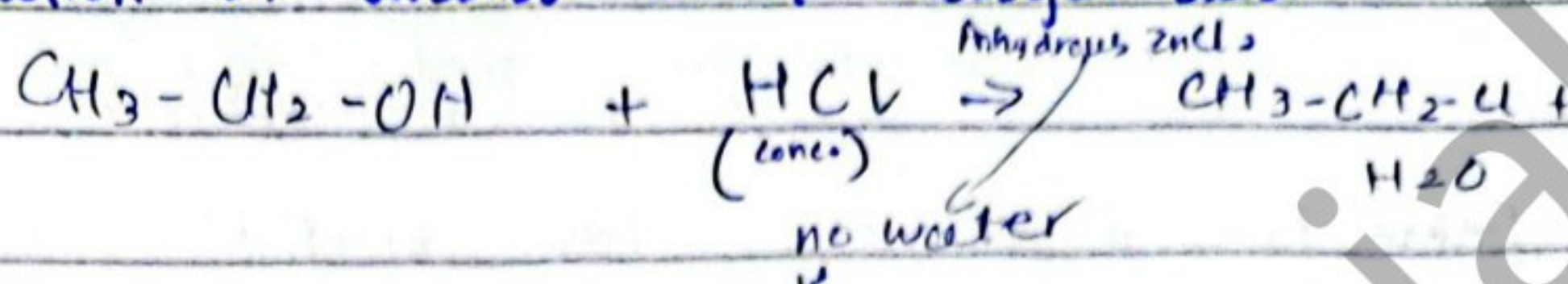
3) **Reaction with phosphorus halide:-**



phosphorous
acid



4- Reaction of alcohol with ^{Acid Halide} halogen acid :-



v. imp Lucas test:- or Identification test for primary, secondary and tertiary alcohol :-

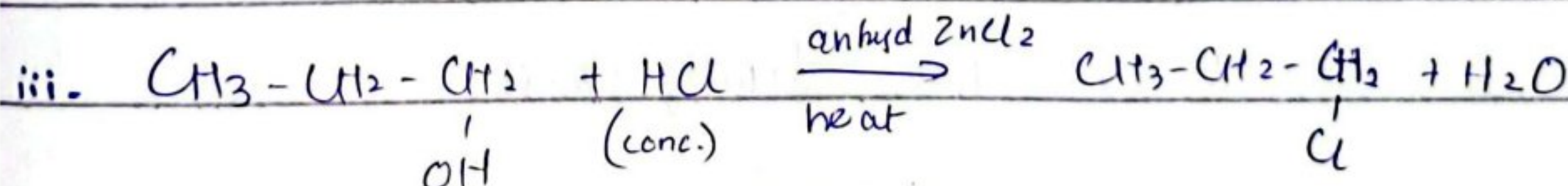
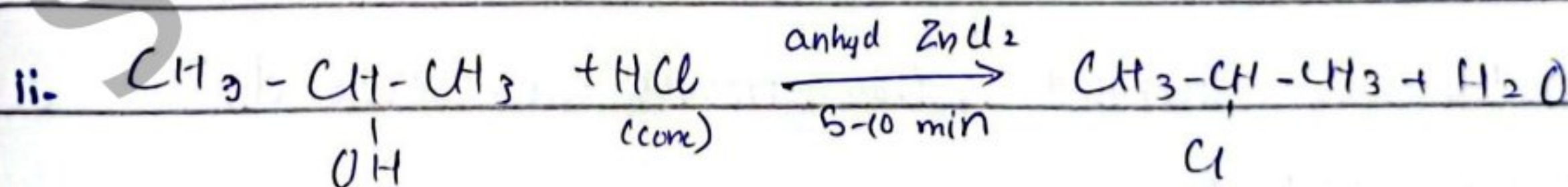
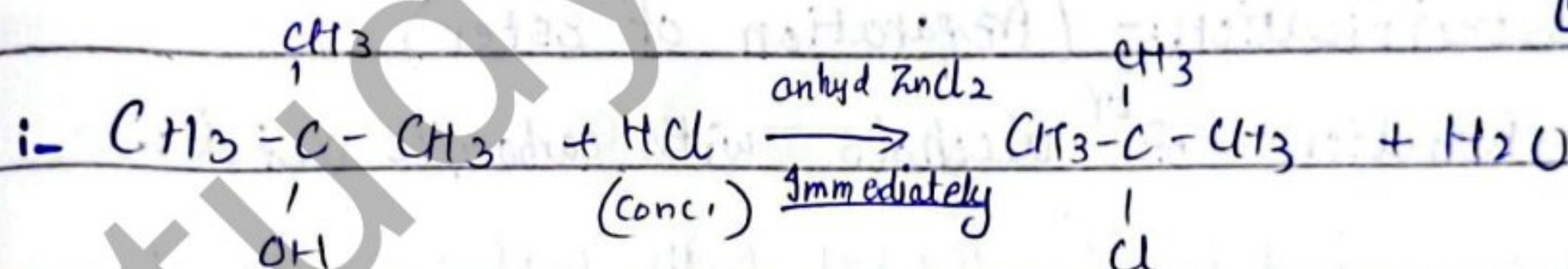
i) Tertiary alcohol form oily layer / insoluble layer immediately.

ii) Secondary alcohol form oily layer within five to ten minutes.

iii) Primary alcohol form insoluble layer only on heating.

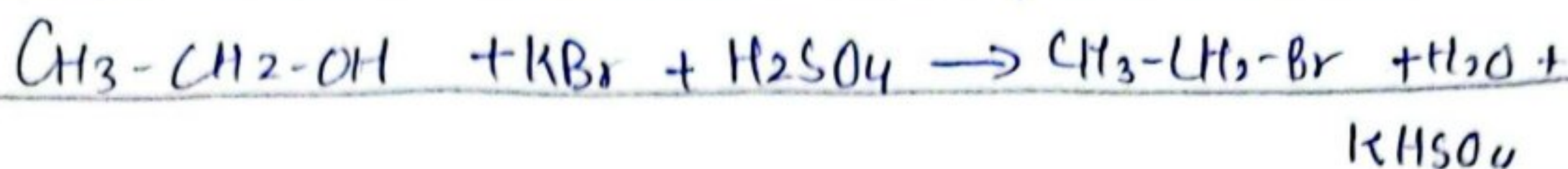
reactions:-

Lucas reagent
mixture of
HCl and ZnCl_2



Q) How will u disting b/w 1-propanol, 2-propanol, 2-methyl 2propanol

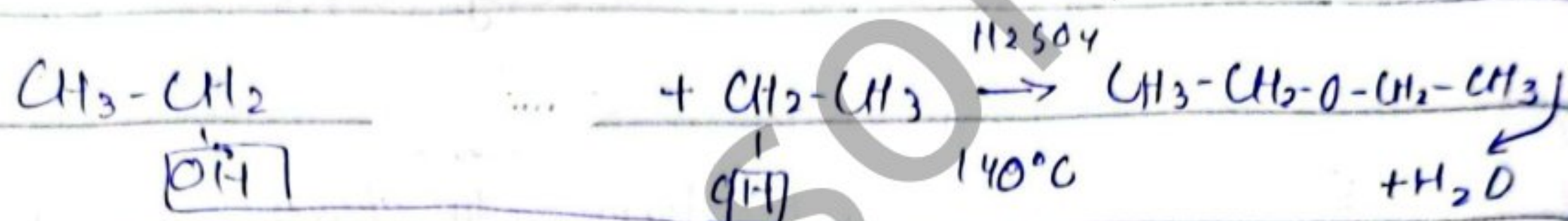
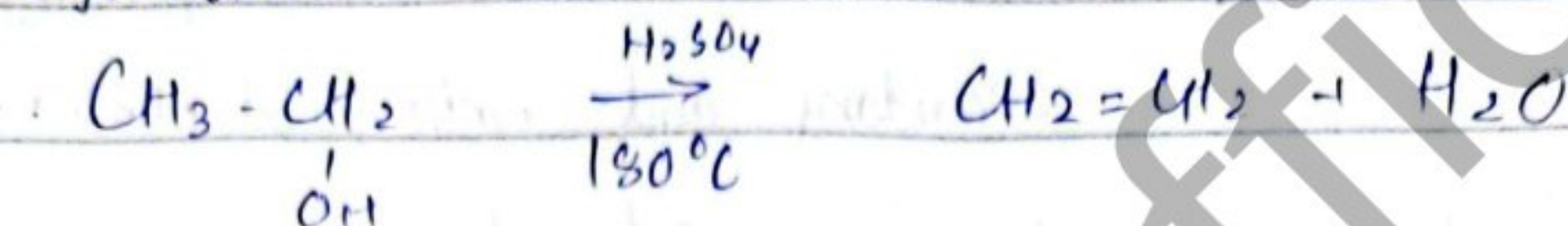
5- Reaction of alcohol with potassium bromide:-



6- Dehydration of alcohol:-

Best dehydrating agent H_2SO_4
140-170°C

Def:- Removal of water from alcohol is dehydration.



Temp = 140°C-170°C or 180°C = reaction 1

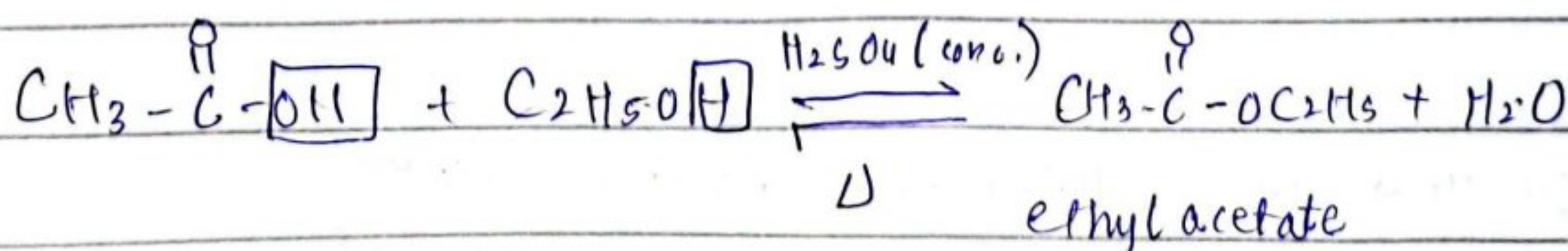
exact 140°C = reaction 2 / if mole not given consider it 2-mole

7- Esterification:- (Preparation of Ester)

Reaction of alcohols with carboxylic acid:-

Def:- When alcohol is reacted with carboxylic acid in the presence of H_2SO_4 as a catalyst ester is formed, this process is called esterification.

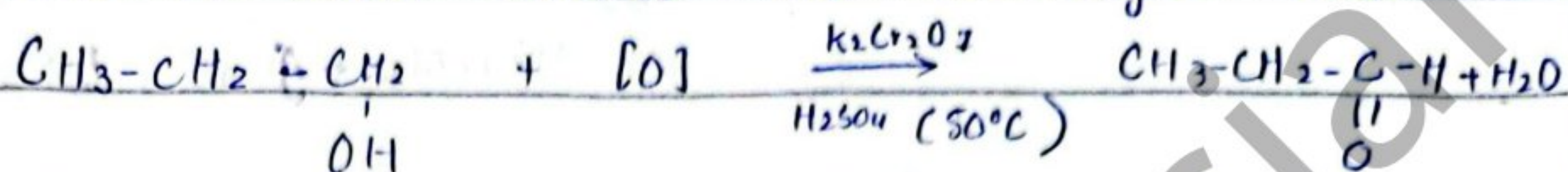
Ester has fruity smell.



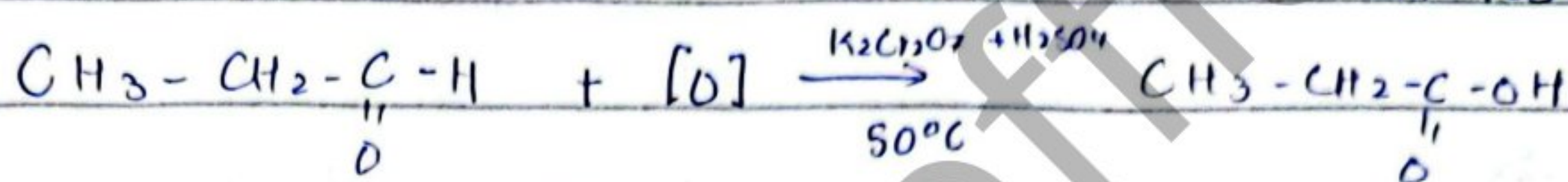
Oxidation:-

- Best oxidizing agent for alcohol is $\text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4$
 other oxidizing agent acidified KMnO_4 source of nascent oxygen

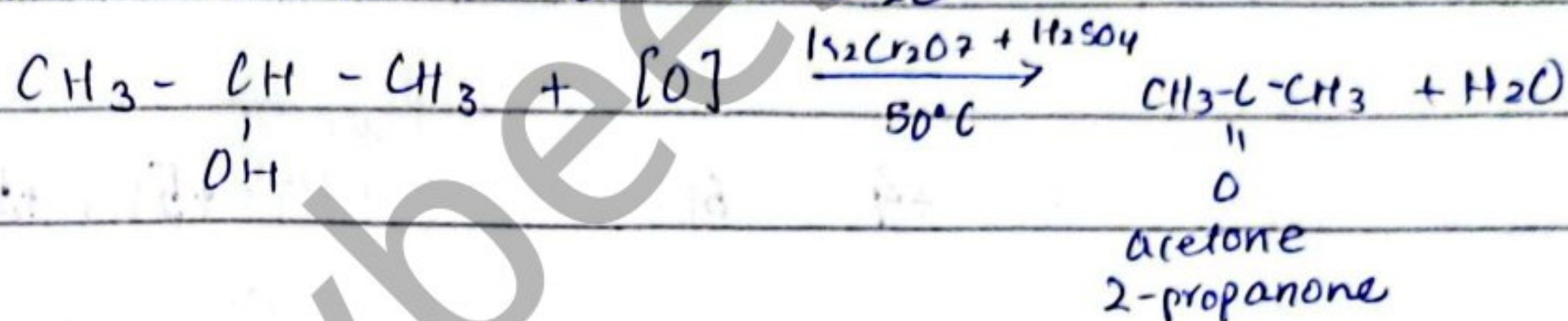
• **Primary alcohol** is oxidized into aldehyde which is further oxidized into carboxylic acid



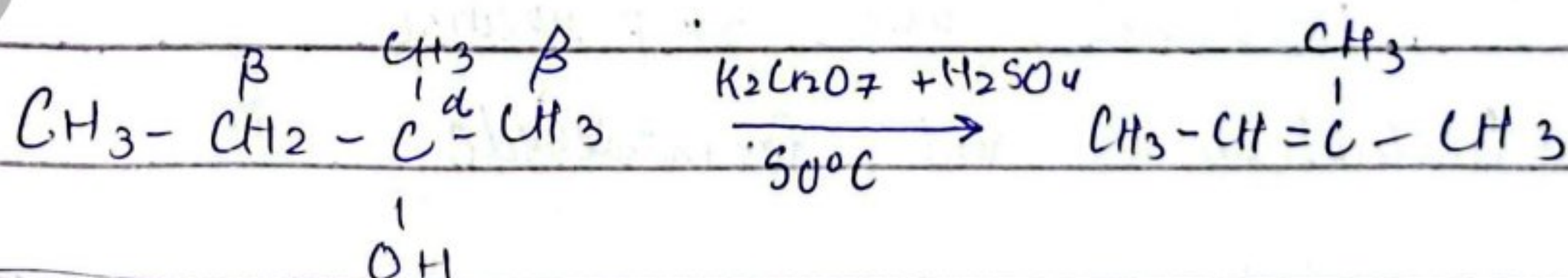
(B) To stop here put reaction in ice



• **Secondary alcohol** is oxidized into ketone which is not further oxidized.



• Tertiary alcohol does not oxidize due to absence of α -hydrogen. Under same condition it undergoes elimination reaction.



Says F rule

Remove H
where H
is less
- on β
carbons

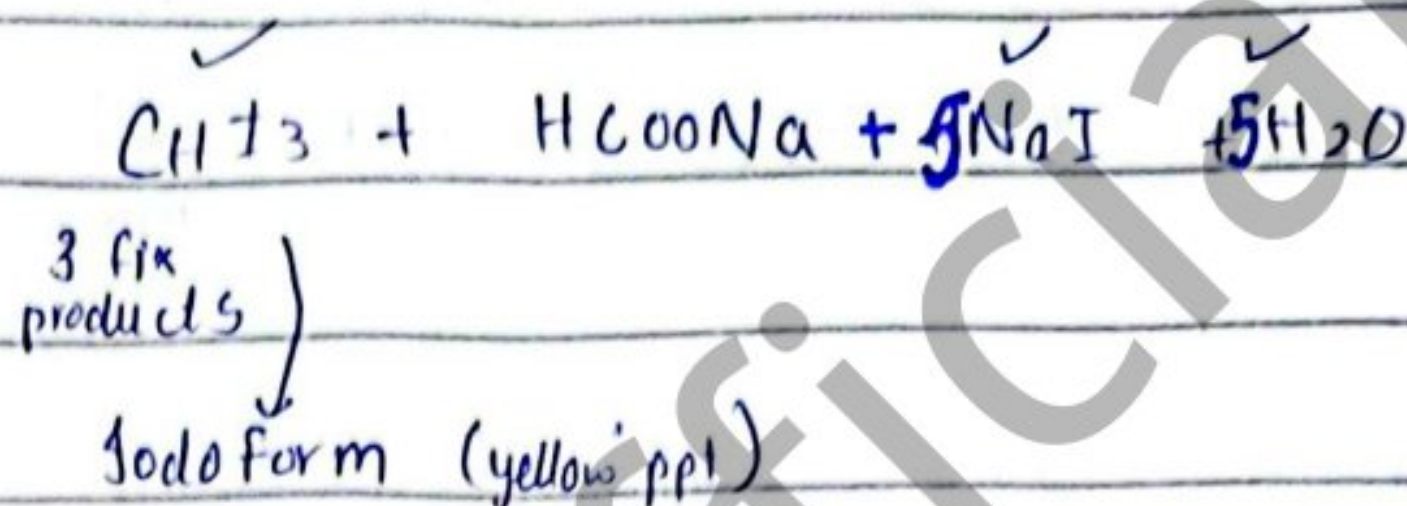
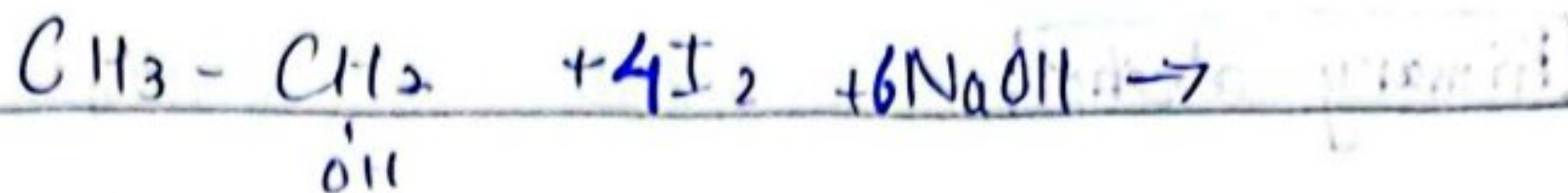
⇒ In this reaction $\text{K}_2\text{Cr}_2\text{O}_7$ is ineffective
 ⇒ Only H_2SO_4 will act as dehydrating agent and undergo dehydration also known as elimination reaction

Q) How will you distinguish between $\overset{\text{I}^-}{\text{I}^-}$ $\xrightarrow{\text{no reaction}}$

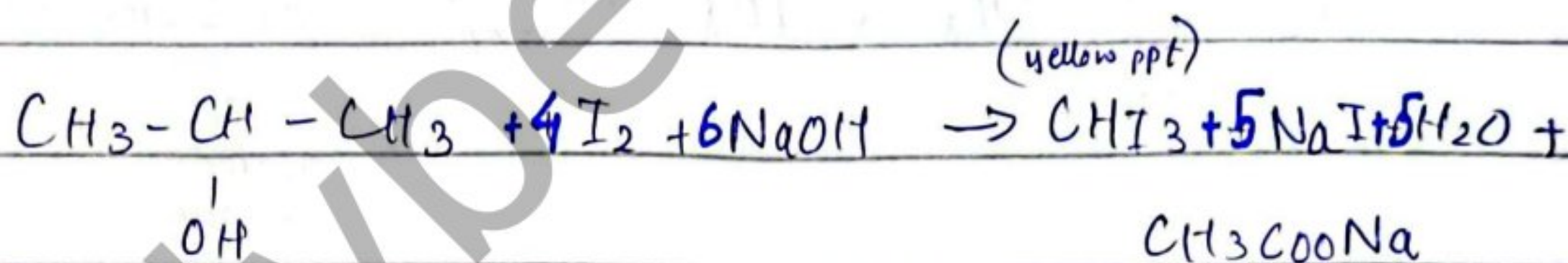
balancing Code 46 55

Iodoform reaction or Haloform reaction

① In primary alcohols only ethanol undergo haloform reaction.



② Secondary alcohol containing $\text{CH}_3 - \underset{\text{OH}}{\text{CH}} -$ group undergo haloform reaction.



Q) How will u distinguish b/w

① Methanol & ethanol Iodoform test

② 1-propanol and 2-propanol

③ 2-pentanol and 3-pentanol

④ Acetaldehyde and formaldehyde
give same reaction no reaction

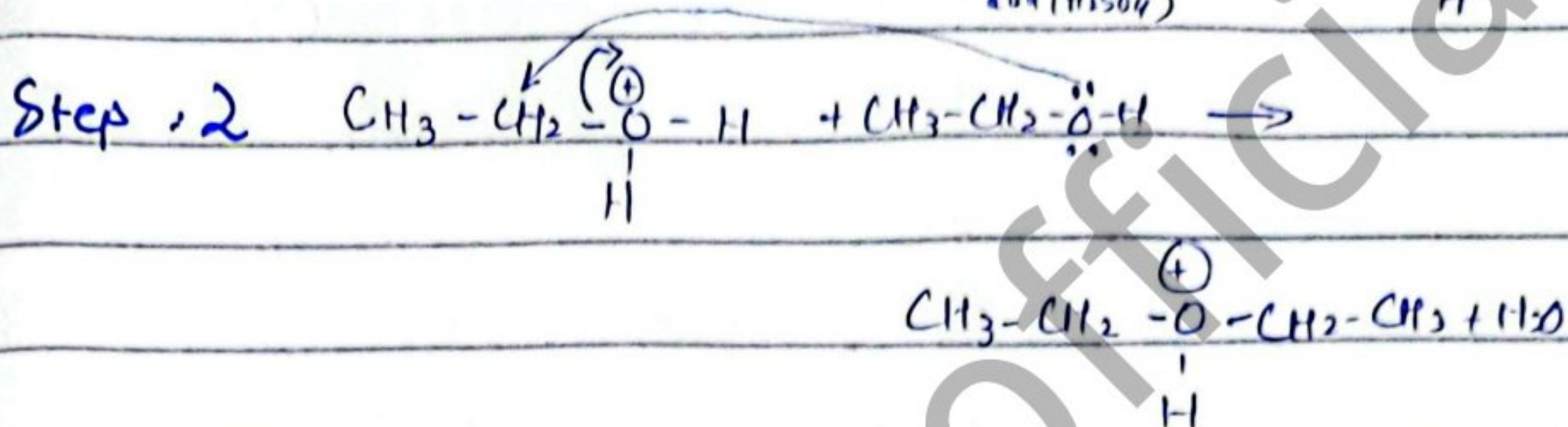
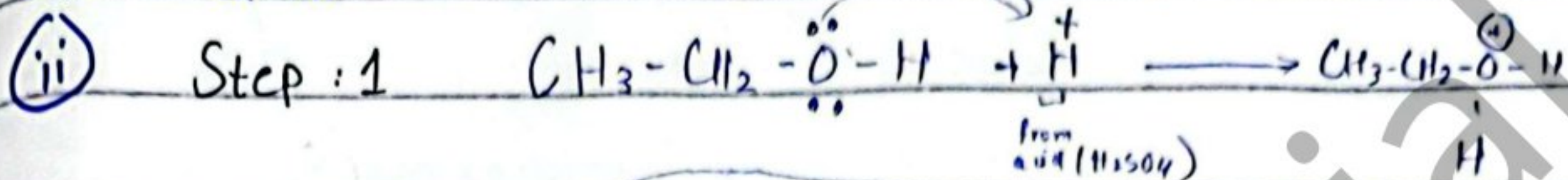
Lucas test will distinguish dif groups pri-sec-ter

This test distinguish groups i.e pri and pri
b/w similar sec-sec

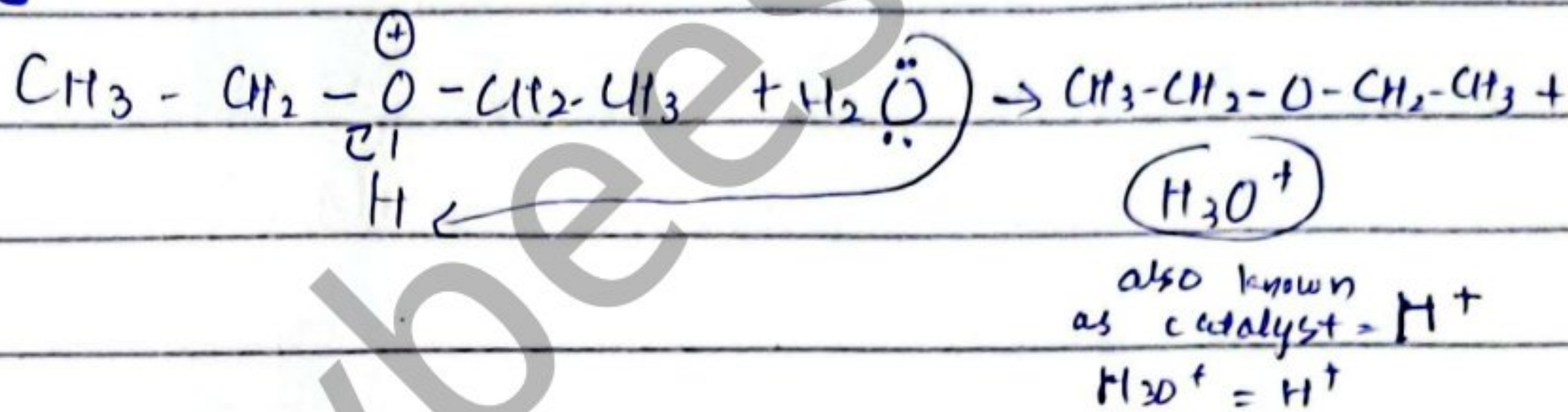
MCOs :-

(i) oxidation	(iv) Methanol
(ii) oxidation	
(iii) ter	

Short Q/A:-

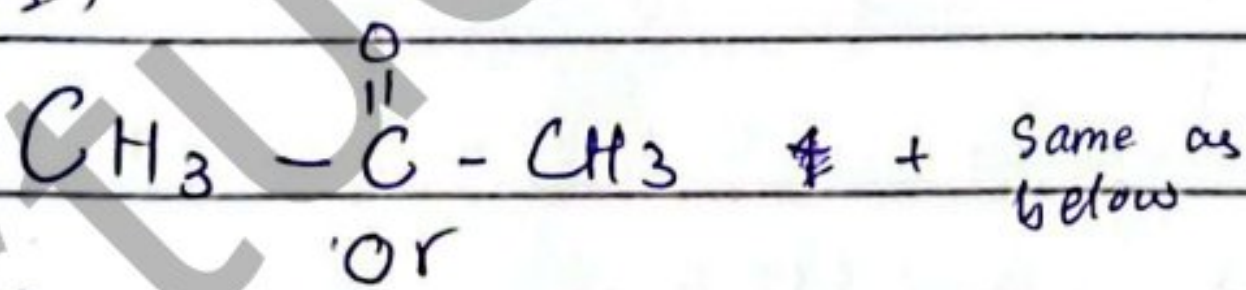


Step : 3

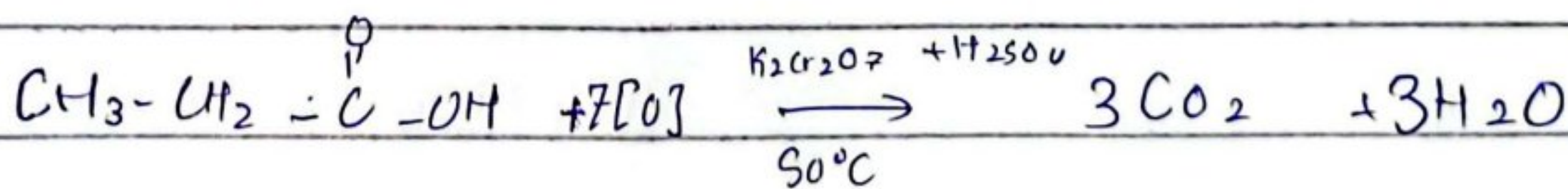
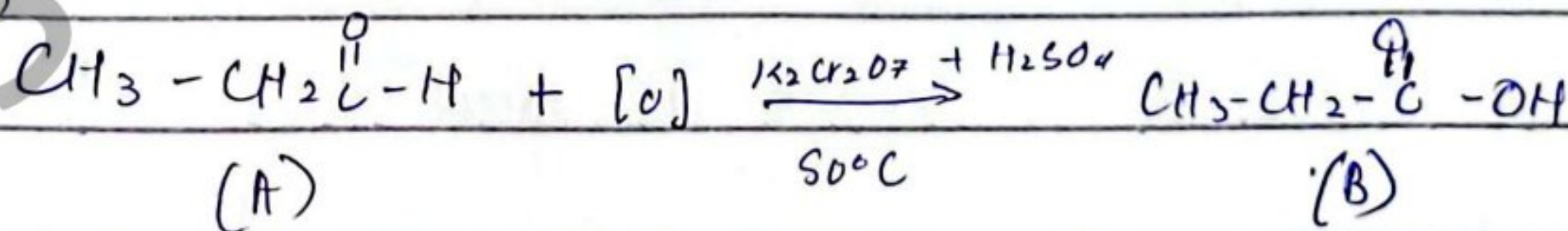


Ex (10) imp

Case (I)



Case (II)



Best ans

OR

