CARBOXYLIC ACID & DERIVATIVES

21-04-2020 (Lecture-2)

Degree-I (Hons.& Sub.)
paper-II
Group-B
Chapter-6

Group -C
Chapter-3
(Organic Portion)

Methods Of Preparation

Carboxylic acids are prepared by the following methods...

1. By Oxidation of 1° alcohol or Aldehyde :::::::---

* 1° alcohols or aldehyde undergo oxidation with a mixture of $K_2Cr_2O_7$ and H_2SO_4 to form carboxylic acid.

* The alcohol is first oxidised to an aldehyde and then to a carboxylic acid.

$$R-CH_2-OH \xrightarrow{[O]} R-CHO \xrightarrow{[O]} R-COOH$$

1° Alcohol — Aldehyde

example;

$$H_3C-CH_2-OH \xrightarrow[H_2SO_4]{K_2Cr_2O_7} H_3C-CHO \xrightarrow[H_2SO_4]{K_2Cr_2O_7} H_3C-COOH$$

Ethanol — Ethanoic Acid

* $KMnO_4$ can also be used in place of $K_2Cr_2O_7$.

* This method is limited to primary alcohols containing no other functional group that is sensitive towards oxidation.

21.04.2020
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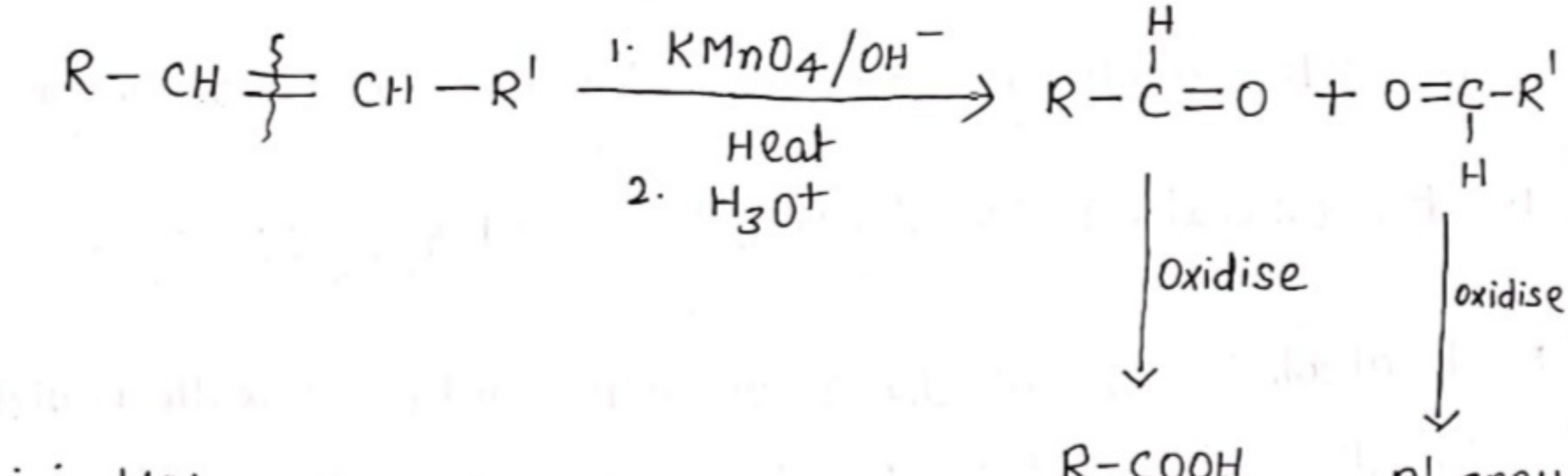
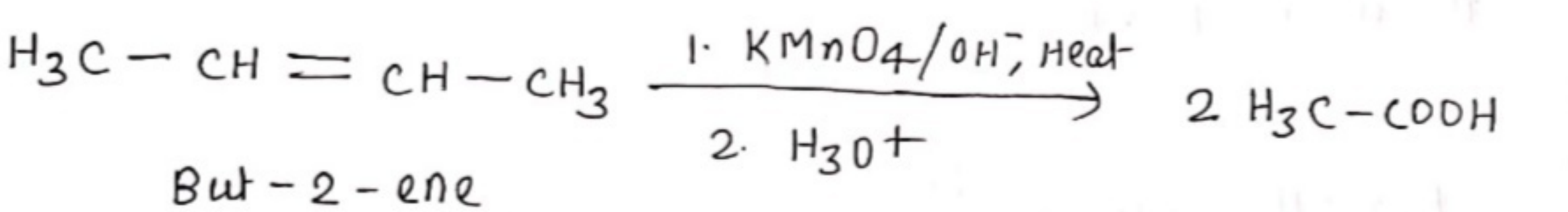
2. By Oxidation of Alkenes :::::::

Certain alkenes react with basic $KMnO_4$ under vigorous condition to produce carboxylic acid.



∵ $KMnO_4$ is strong O.A, it oxidises aldehyde to corresponding acids.

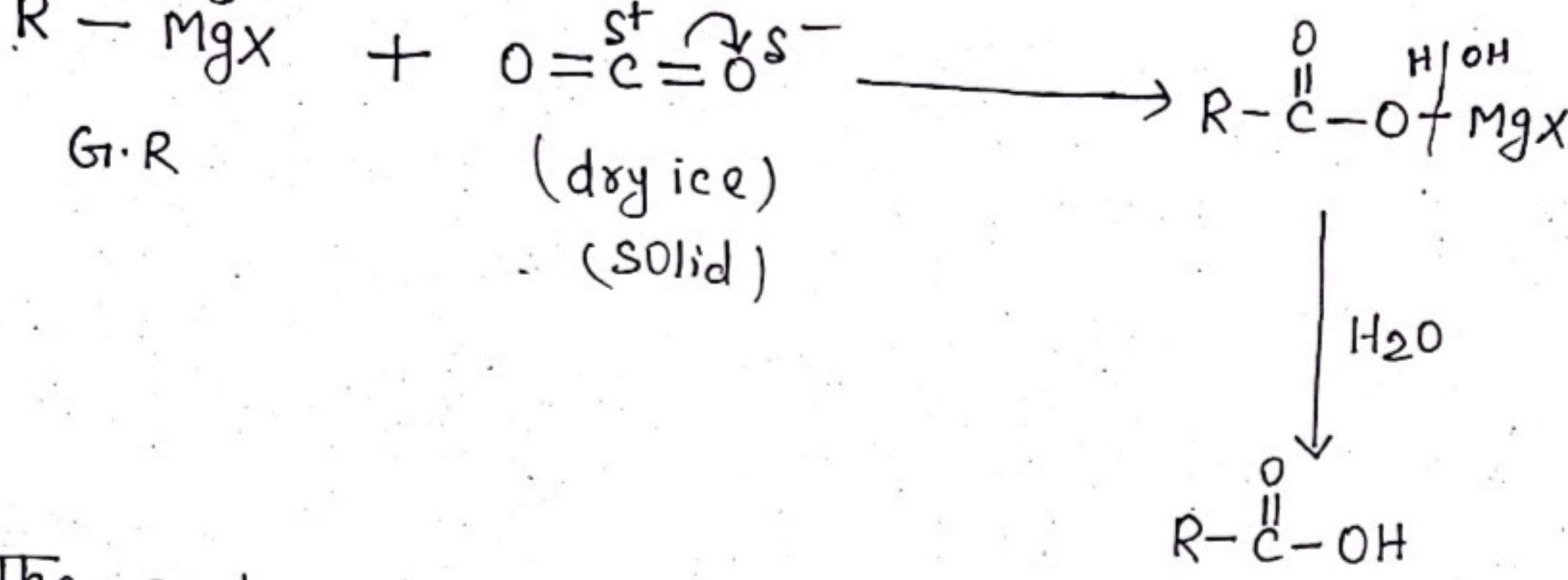


3. By using Grignard Reagent :::::::

* Grignard Reagent allowed to react with carbon dioxide. On hydrolysis, a carboxylic acid containing one more carbon atom is obtained.

* This is useful method to increase length of the carbon chain.

Continued.....



* The carbon dioxide is usually supplied from dry ice, and this reaction is sometimes called carbonation.

Note :-

Alkyl halides that contain substituent group eg. ($-OH$, $>C=O$, $-NO_2$) cannot be used to produce carboxylic acids because these alkyl halides can't produce Grignard Reagents.

* Alkyl Lithium compounds are also reactive towards carbon dioxide and give carboxylic acids in good yield.