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NURSING

191MHS021101

CHM102 ASSIGNMENT

1.) The IUPAC names of the following compounds

a. HCOOH

methanoic acid

b. $\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH}$

Pentan-1,5,-dioic acid

c. $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$

Butanoic acid

d. $\text{HO}_2\text{C}-\text{CO}_2\text{H}$

Ethanedioic acid

e. $\text{CH}_3(\text{CH}_2)_4\text{COOH}$

Hexanoic acid

f. $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH}$

Hex-4-eneoic acid

2. Physical Properties of carboxylic acid

i. Physical appearance :-

All simple aliphatic carboxylic acids up to C_{10} are liquids at room temperature. Most other carboxylic acids are solid at room temperature although anhydrous carboxylic acid (acetic acid) also known as glacial ethanoic acid freezes to an ice-like solid below the room temperature.

ii. Boiling points :-

Boiling point increases with increasing relative molecular

mass. Aromatic carboxylic acids are crystalline solids and have higher melting points than their aliphatic counterparts of comparable relative molecular mass.

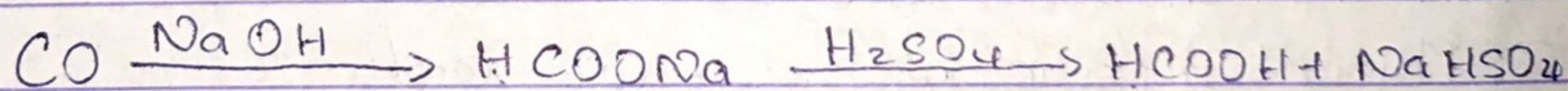
iii) Solubility:-

Lower molecular mass carboxylic acids with up to four carbon atoms in their molecules are soluble in water, this is largely due to their ability to form hydrogen bonds with water molecules. The water solubility of the acids decreases as the relative molecular mass increases because the structure becomes relatively more hydrocarbon in nature and hence covalent. All carboxylic acids are soluble in organic solvents.

3. Industrial Preparation of Carboxylic acid.

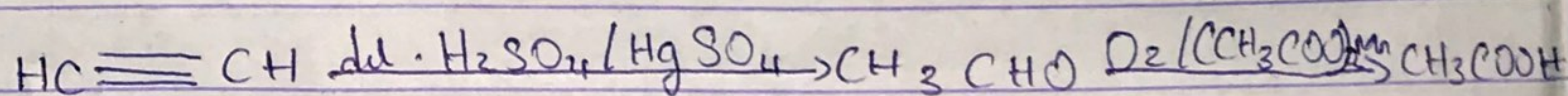
a. From carbon (II) oxide

Methanoic acid is manufactured by adding carbon(II) oxide under pressure to hot aqueous solution of sodium hydroxide. The free carboxylic acid is liberated by careful reaction with tetraoxosulphate (VI) acid (H_2SO_4).

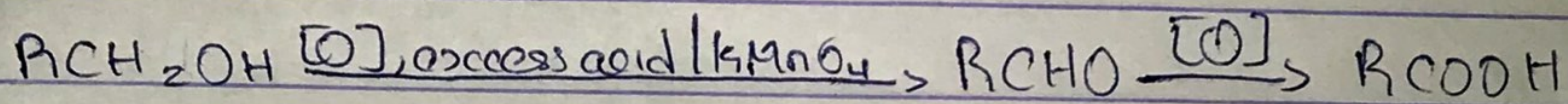


b) From ethanol

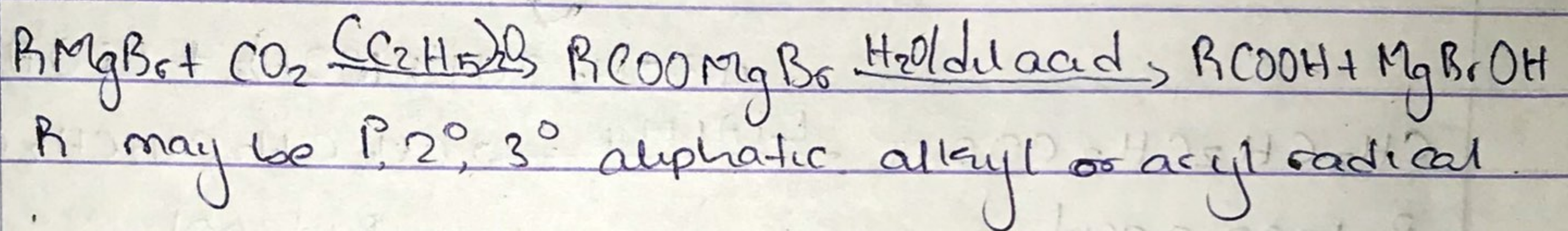
Ethanoic acid is obtained commercially by the liquid phase air-oxidation of a 5% solution of ethanol to ethanoic acid using manganese(II) ethanoate catalyst. Ethanol itself is obtained from ethylene.



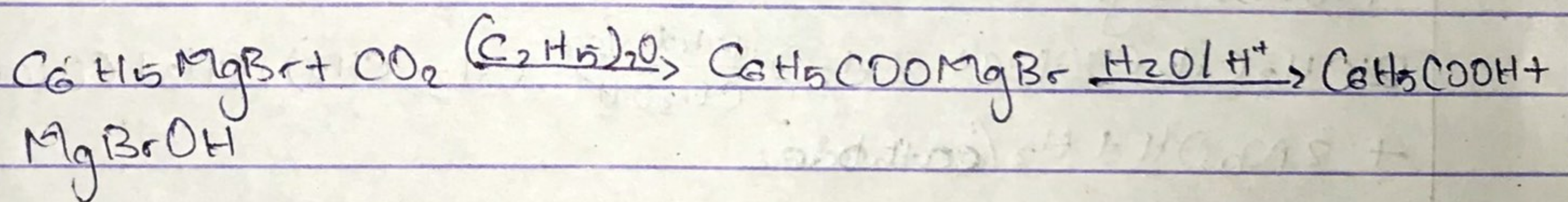
4) Oxidization of primary alcohols and aldehydes can be used to prepare carboxylic acids using the usual oxidizing agents in acidic solution



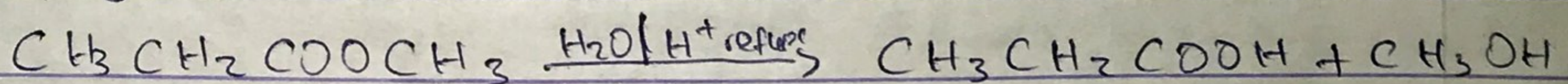
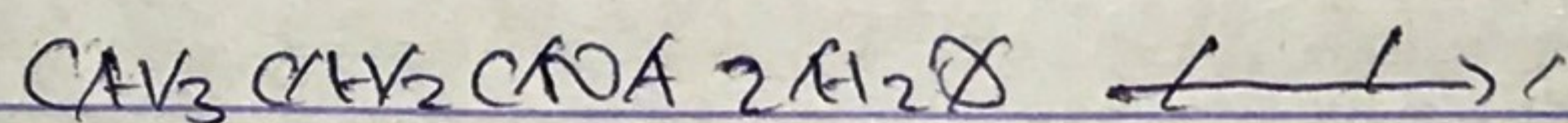
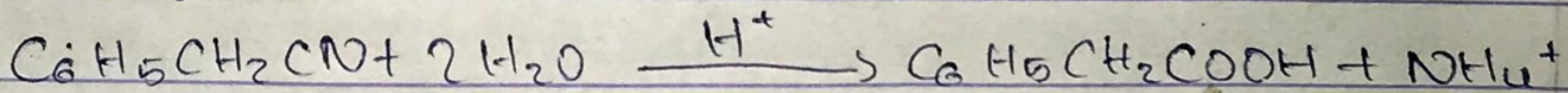
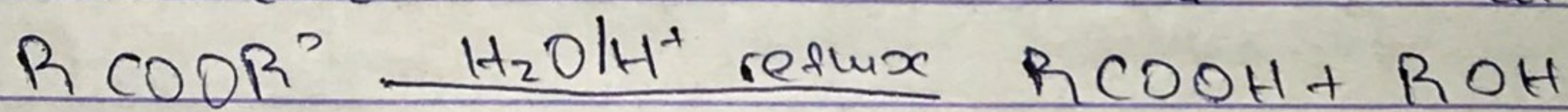
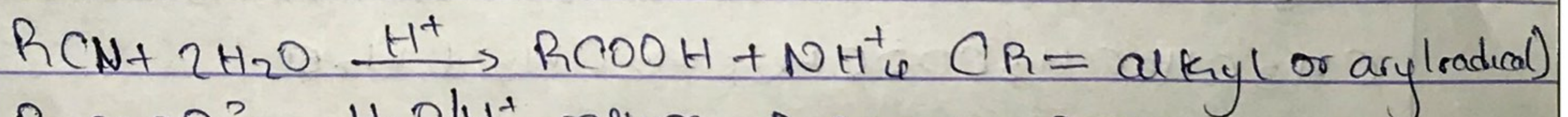
* Carbonation of Grignard reagent. We can obtain aliphatic carboxylic acid by bubbling carbon(ii) oxide into Grignard reagent and the hydrolyzed with dilute acid



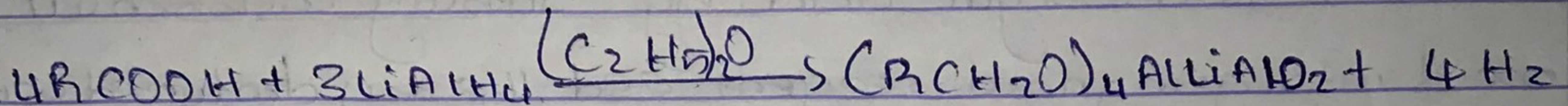
In preparing benzoic acids the reagent is added to solid carbon(ii) oxide (dry ice) which also serves as coolant to the reaction mixture.



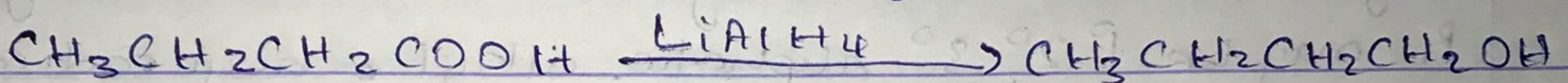
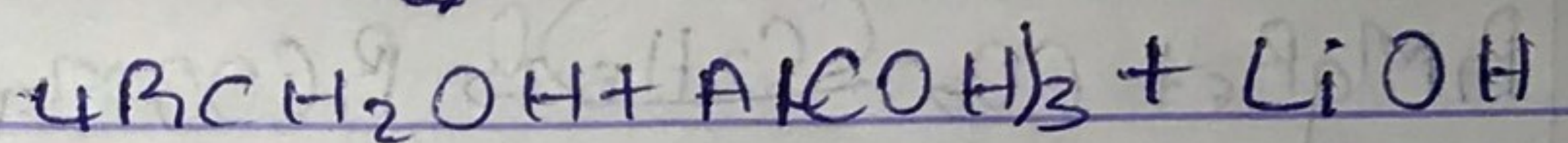
∞ Hydrolysis of nitriles (cyanides) or esters



5i) Reduction



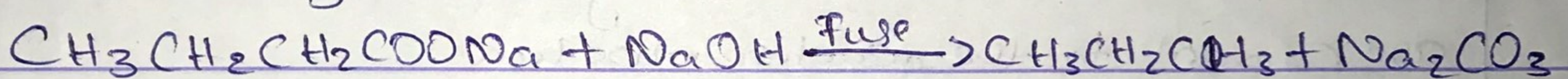
4 H₂O



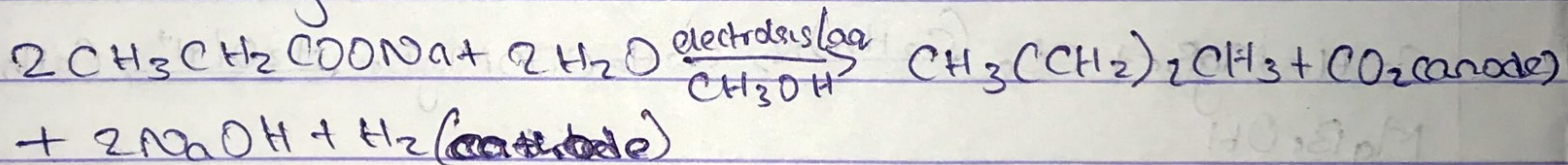
Butanoic acid

Butanol

5ii) Decarboxylation



Kolbe synthesis



5iii) Esterification

