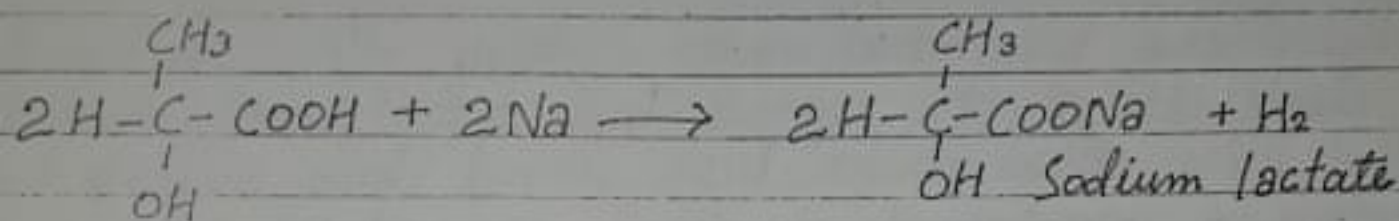


### Physical properties :-

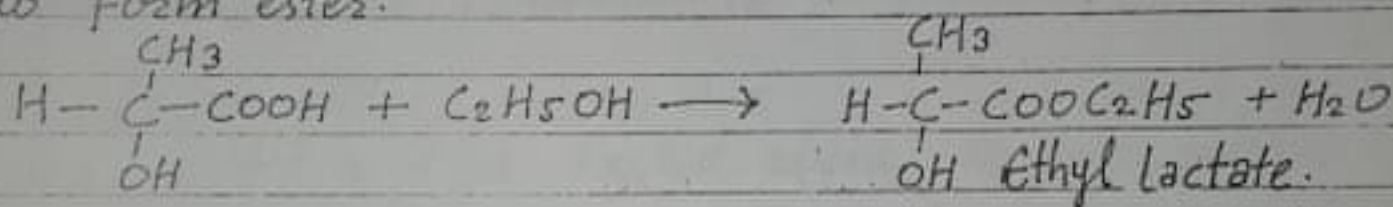
1. Ordinary lactic acid is inactive and colourless liquid.
2. Melting point  $18^{\circ}\text{C}$
3. Boiling point  $122^{\circ}$
4. It has a sour taste.
5. It is hygroscopic and extremely soluble in water.

### Chemical properties :

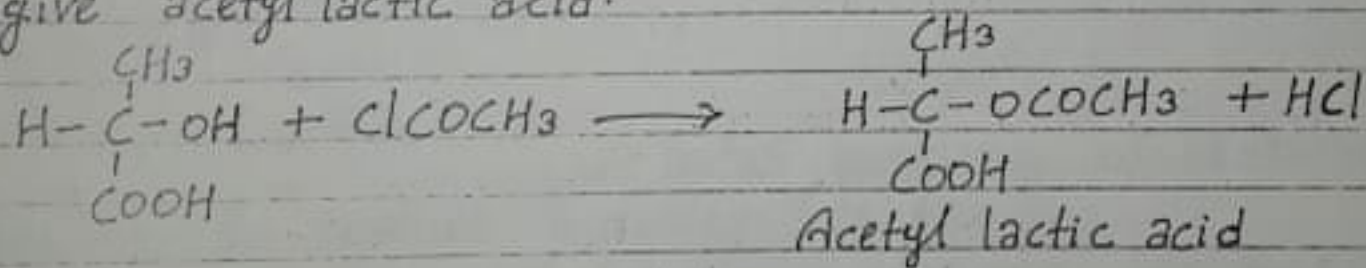
1. Reaction with Na :- Na reacts with lactic acid to form sodium lactate and evolved  $\text{H}_2$  gas.



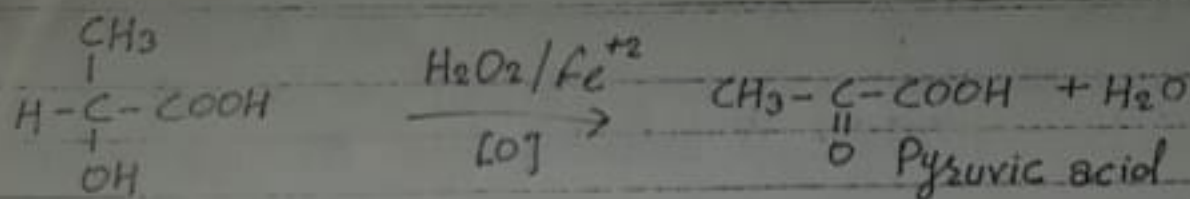
2. Reaction with alcohol :- Lactic acid reacts with alcohol to form ester.



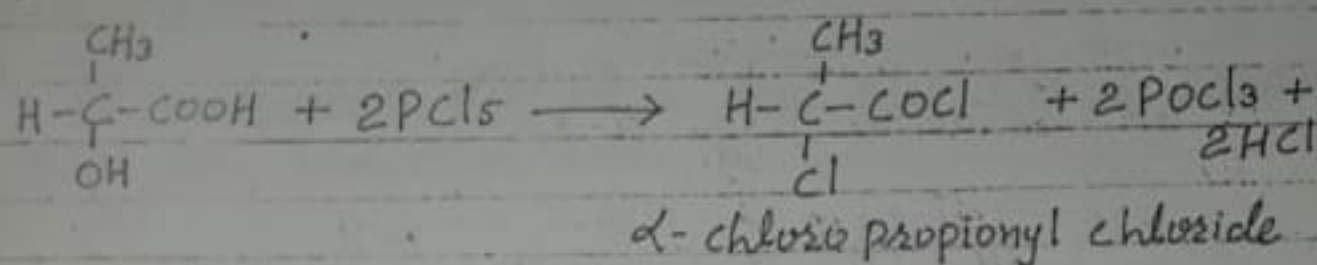
3. Reaction with Acetyl chloride :- Acetyl chloride reacts with lactic acid to give acetyl lactic acid. Hydroxy group of lactic acid reacts with acetyl chloride to give acetyl lactic acid.



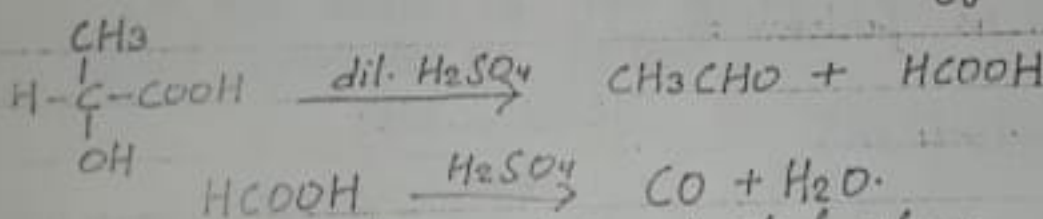
4. Oxidation :- When lactic acid oxidised mild O.A fenton's reagent ( $\text{H}_2\text{O}_2 + \text{Fe}^{++}$ ) to give pyruvic acid because secondary alcohol oxidised into ketone.



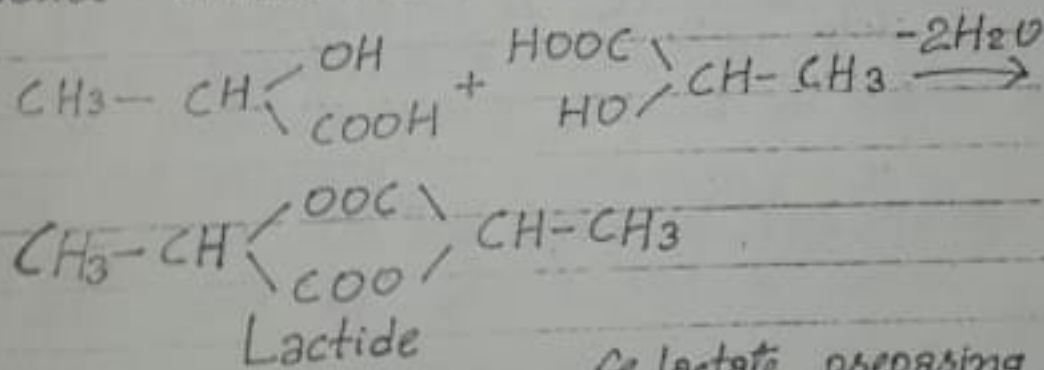
5. Reaction with  $\text{PCl}_5$  :-  $\text{PCl}_5$  attacks both the groups hydroxy and acidic to give chloro propionyl chloride.



6. Reaction with  $\text{H}_2\text{SO}_4$  :- When lactic acid ~~reacts with~~ heated with dil.  $\text{H}_2\text{SO}_4$  then lactic acid changes into acetaldehyde and formic acid. formic acid again reacts with  $\text{H}_2\text{SO}_4$  to evolved  $\text{CO}$  because  $\text{H}_2\text{SO}_4$  is hygroscopic in nature.



7. When lactic acid is heated alone to give cyclic diester called lactide.



Fe lactate preparing of Fe-tollem.

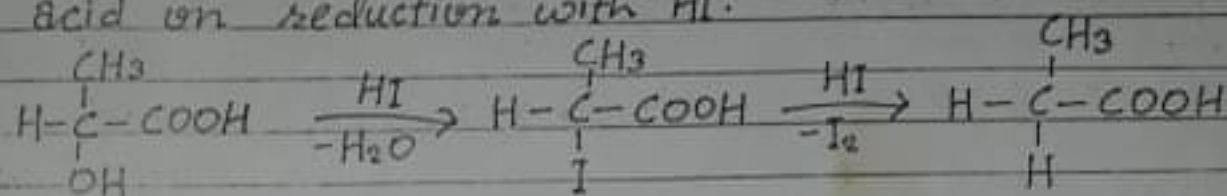
- Uses :-
1. In leather industry for tanning.
  2. It is used for soft drinks to improve flavours.
  3. In food of infants due to its corrective effect in the digestive tract.
  - (4) It is used in preparation of useful lactates. Ex:- Antimony lactate, wool darning, ethyl lactate as a solvent, Ag lactate as an antiseptic.

Establish the structure of Lactic acid

(1) By the elemental analysis and molecular wt determination its mol. formula is  $C_3H_6O_3$ .

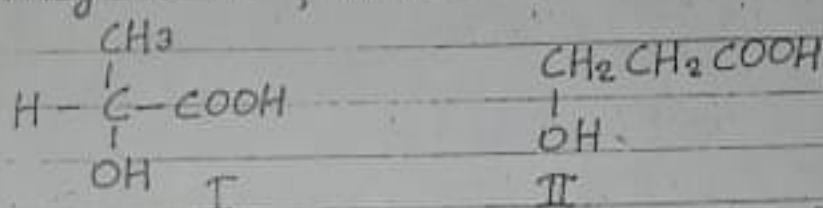
(2) Lactic acid gives effervescence with  $NaHCO_3$  and also form salts and esters indicating the presence of  $-COOH$  group.

(3) It undergoes acetylation and also forms propanoic acid on reduction with HI.



The above reaction reveals that hydroxy group present in lactic acid.

(4) On the basis of for going facts the str. of lactic acid may be as follows:



(5) When lactic acid is oxidised with Fenton's reagent to give pyruvic acid. Formation of pyruvic acid indicates that alcoholic group present in lactic acid is secondary not primary.

On the basis of for going facts str. of lactic acid is str. I not II.

(6) Finally the structure proved by its synthesis.

