#74109

* Various methods of preparation of Esters?

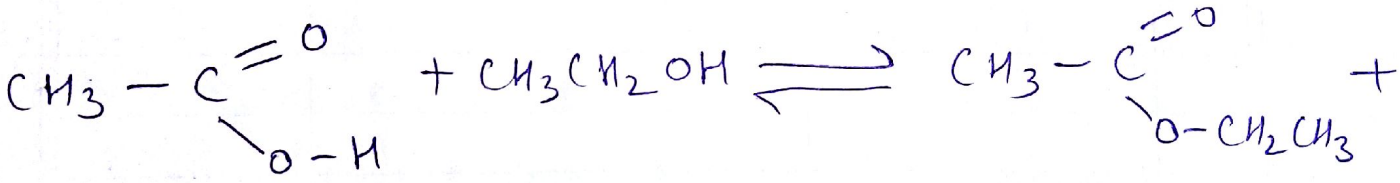
Ans → ① Making esters using Carboxylic acids

This method can be used for converting alcohols into esters, but it doesn't work with phenols - compounds where the -OH group is attached directly to a Benzene ring. Phenols react with carboxylic acids so slowly that the reaction is unusable for preparation purposes.

The esterification reaction is both slow and reversible.

The equation for the reaction between an acid RCOOH and an alcohol R'OH (where R & R' can be different or same) is:-

For example, if we make ethyl ethanoate from ethanoic acid & ethanol, the equation would be :-



H_2O

② Making esters using Acyl chlorides (Acid chlorides)

This method will work for Alcohols & Phenols. In the case of phenols, the reaction is sometimes improved by first converting phenol into a more reactive form.

The basic reaction

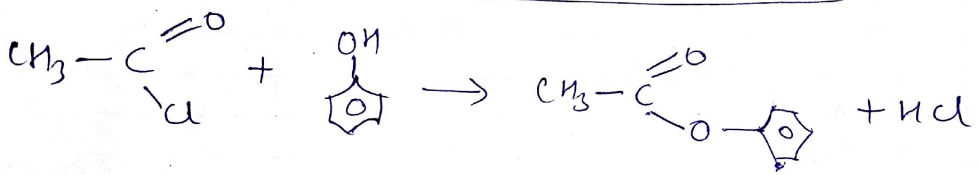
If we add an acyl chloride to an alcohol, you get a vigorous reaction at room temperature producing an ester & clouds of steamy acid fumes of hydrogen chloride.

For example,

$$CH_3COCl + CH_3CH_2OH \longrightarrow CH_3COOCH_2CH_3 + HCl$$

(Ethanoyl chloride) (Ethanol) (Ethyl Ethanoate)

Reaction between ethanoyl chloride & Phenol



(3) Making Esters using Acid Anhydrides

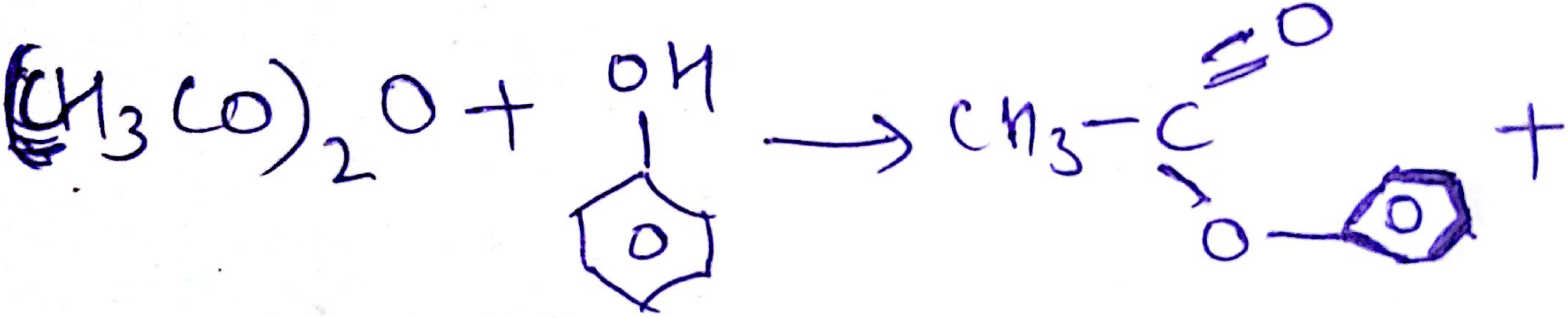
This reaction can again be used to make esters from both alcohols & phenols. The reactions are slower than the corresponding reactions with Acyl chlorides and you usually need to warm the mixture.

In the case of a phenol, you can react the phenol with sodium hydroxide solution first, producing the more reactive phenoxide ion.

There is a slow reaction at room temperature (or faster on warming). There is no visible change in the colourless liquids, but a mixture of ethyl ethanoate & ethanoic acid is formed.

$$(CH_3CO)_2O + CH_3CH_2OH \longrightarrow CH_3COOCH_2CH_3 + CH_3COOH$$

The reaction with Phenol is similar, but will be slower. Phenyl ethanoate is formed together with ethanoic acid.



CH_3COOH