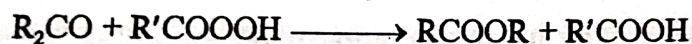
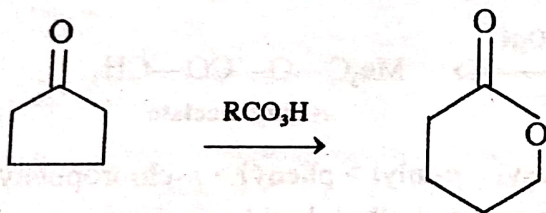


20.3 Baeyer-Villiger Reaction (Rearrangement)

The reaction consists in the oxidation of a ketone into an ester by means of a peracid.

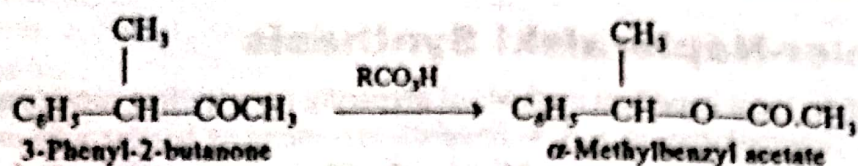


Cyclic ketones give lactones.



A number of peracids *viz.* trifluoroperacetic, peracetic, perbenzoic, monoperphthalic, monopersulphuric acid, etc., have been successfully used in the reaction. But trifluoroperacetic acid is the most reactive among all the above mentioned peracids.

The mechanism of this reaction is believed to involve acid-catalysed addition of the per acid to the ketonic carbonyl group to form an intermediate peroxide, followed by migration of an alkyl group to an electron-deficient peroxide oxygen atom.

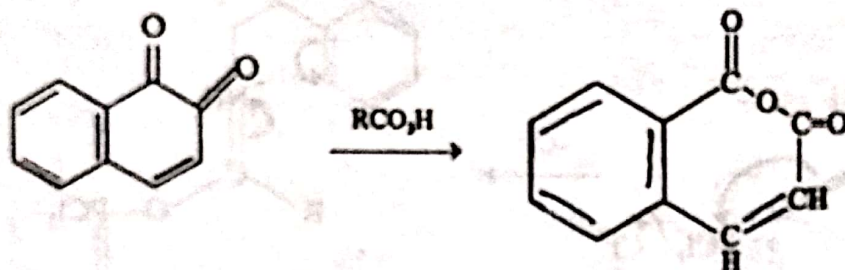
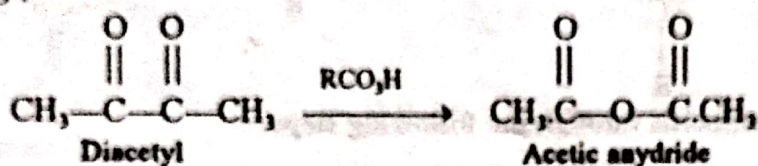


Applications : 1. The reaction is frequently used for the synthesis of the following types of compounds.

✓(a) *Esters and acids :*

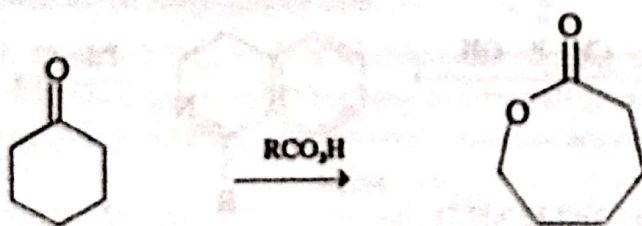


✓(b) *Anhydrides :* When α -diketones or *o*-quinones are treated with peracids, anhydrides are produced, e.g.,



1, 2-Naphthaquinone

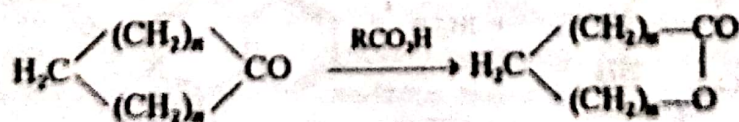
✓(c) *Lactones :* Cyclic ketones undergo ring expansion with peracids, e.g., cyclohexanone gives ϵ -caprolactone.



Cyclohexanone

ϵ -Caprolactone

By this method lactones containing large rings (fourteen to eighteen membered rings) have been prepared by the oxidation of the respective ketone (Ruzicka and Stoll, 1928).



2. The Baeyer-Villiger rearrangement is also useful in the degradation of organic molecules for proof of structure. This is because a carbon-carbon bond is broken and the ester produced can be easily hydrolysed; this divides the molecule into two fragments for easier identification.