

ORGANIC CHEMISTRY, PAPER-VII ^{1.}

DEGREE-III (HONOURS)

ORGANIC NAMED REACTION

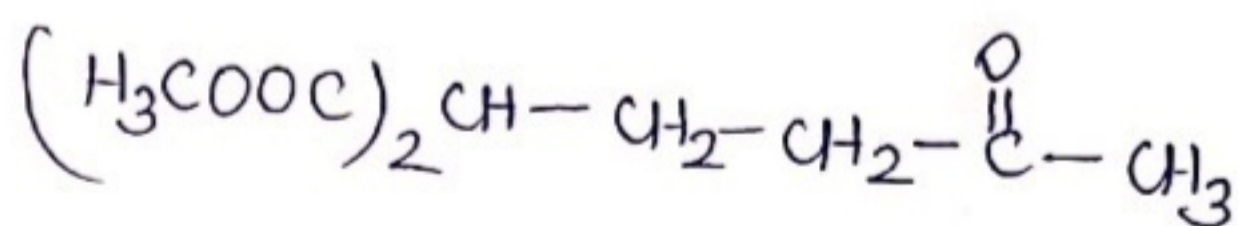
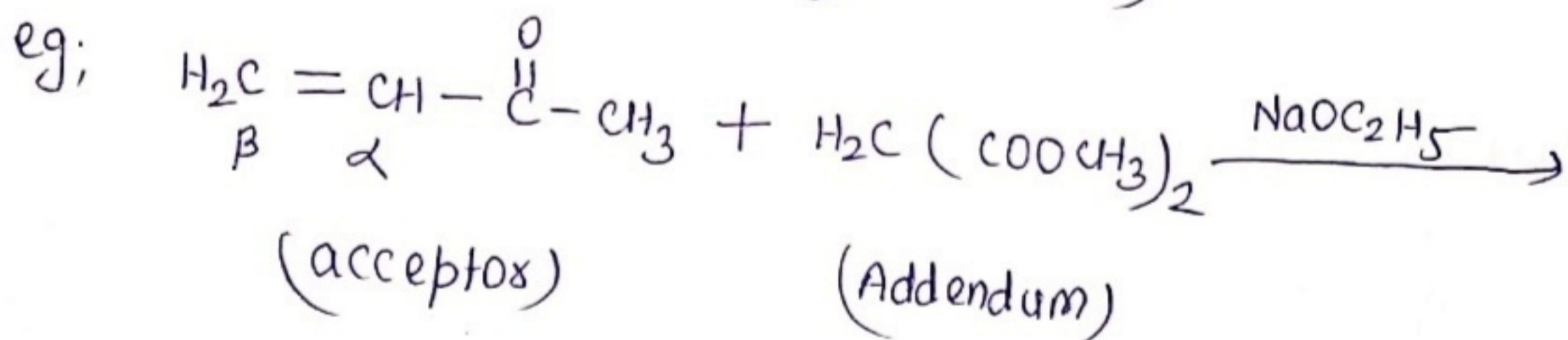
09/09/2020

LECTURE-1

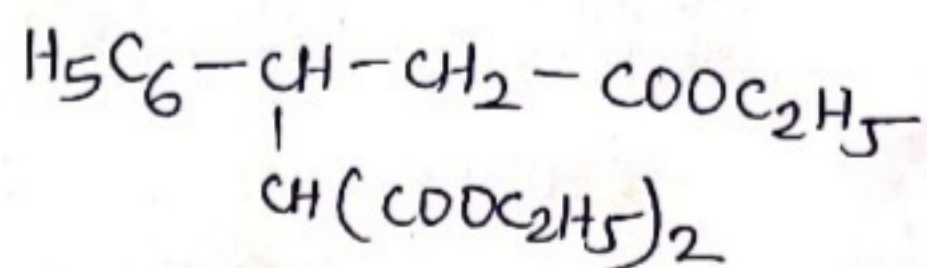
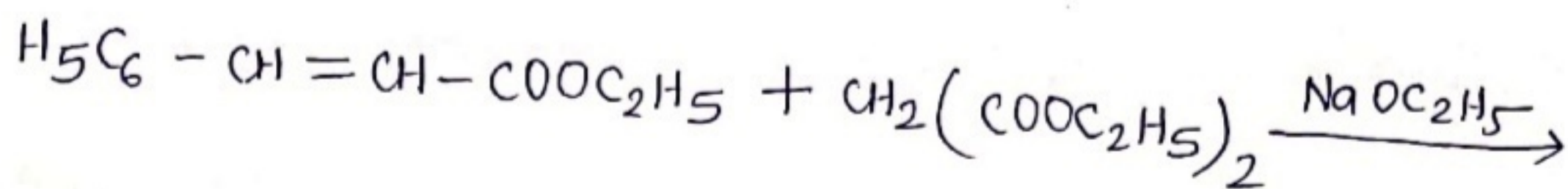
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MICHAEL ADDITION REACTION

* It is the addition reaction between an α, β -unsaturated carbonyl compound and a compound with an active methylene group (eg; malonic ester, acetoacetic ester, etc.) in presence of a base, eg. sodium ethoxide or a secondary amine (usually piperidine).



or,



COMPONENTS OF THE MICHAEL ^{2.} REACTION

- * The compound having an active methylene group or having relatively acidic hydrogen are called donors, and the compound having an activated double bond are called acceptors.
- * A large variety of donors and acceptors are employed in Michael reaction.

Donors (Addenda)

- * The donors include malonic esters, cyanoacetic ester, acetoacetic ester, Phenylacetic acid ester, cyanoacetamide, aliphatic nitro-compounds, benzyl cyanides, Sulphones, cyclopentadienes, indenes, fluorenes etc.

Acceptors Includes

- (a) Aldehyde :- eg. acetaldehyde ($\text{H}_2\text{C}=\text{CH}-\text{CHO}$)
cinnamaldehyde ($\text{C}_6\text{H}_5-\text{CH}=\text{CH}-\text{CHO}$)

- b. Ketones: e.g. Chalcone ($\text{C}_6\text{H}_5-\text{CH}=\text{CH}-\overset{\text{O}}{\parallel}{\text{C}}-\text{C}_6\text{H}_5$),
 benzylidene acetone ($\text{C}_6\text{H}_5\text{CH}=\text{CHCOCH}_3$),
 mesityloxide [$(\text{H}_3\text{C})_2\text{C}=\text{CH}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$]
- c. Esters :- Ethylcinnamate ($\text{C}_6\text{H}_5-\text{CH}=\text{CH}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OC}_2\text{H}_5$)
 acrylic ester ($\text{H}_2\text{C}=\text{CH}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OCH}_3$)
 fumaric ester ($\text{C}_2\text{H}_5-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}=\text{CH}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OC}_2\text{H}_5$)
- d. Nitriles: Acrylonitrile ($\text{H}_2\text{C}=\text{CH}-\text{CN}$) etc.

CATALYSTS

Various types of basic catalysts are used.

- * Most commonly used are alkali metal alkoxides, such as sodium or potassium ethoxide, potassium tertiary butoxides, potassium isopropoxide etc.
- * Mild basic catalyst such as 2° amines $(\text{C}_2\text{H}_5)_2\text{NH}$, 3° amines $(\text{C}_2\text{H}_5)_3\text{N}$, piperidine and pyridine etc.

To be continued in next lecture..