

11/10/17

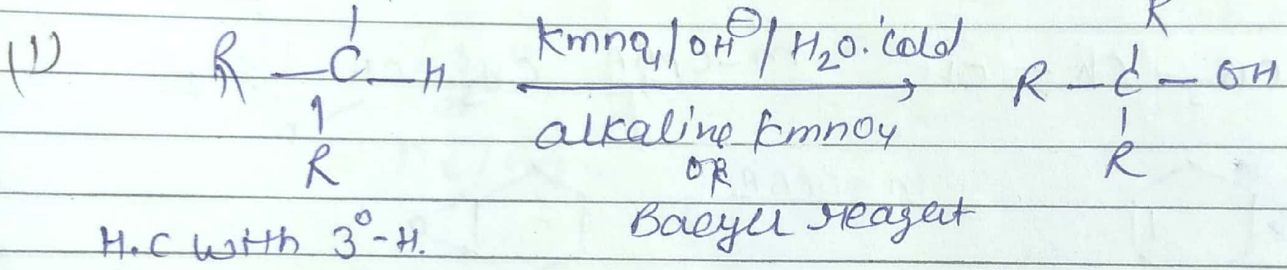
SBG STUDY

Hydro Carbon

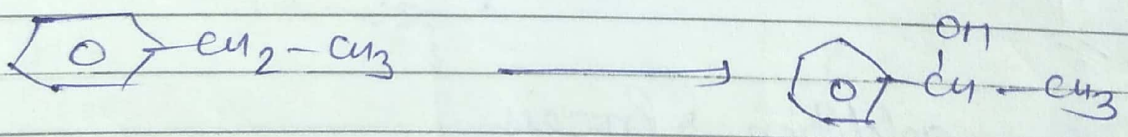
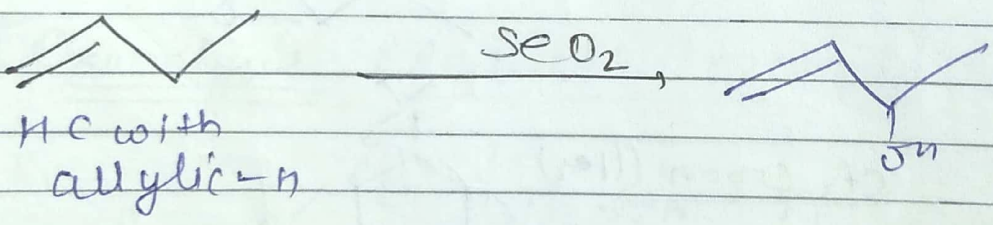
- Alkane
- Alkene
- Alkyne
- Aromatic Compound

(A) Oxidation of HC :-

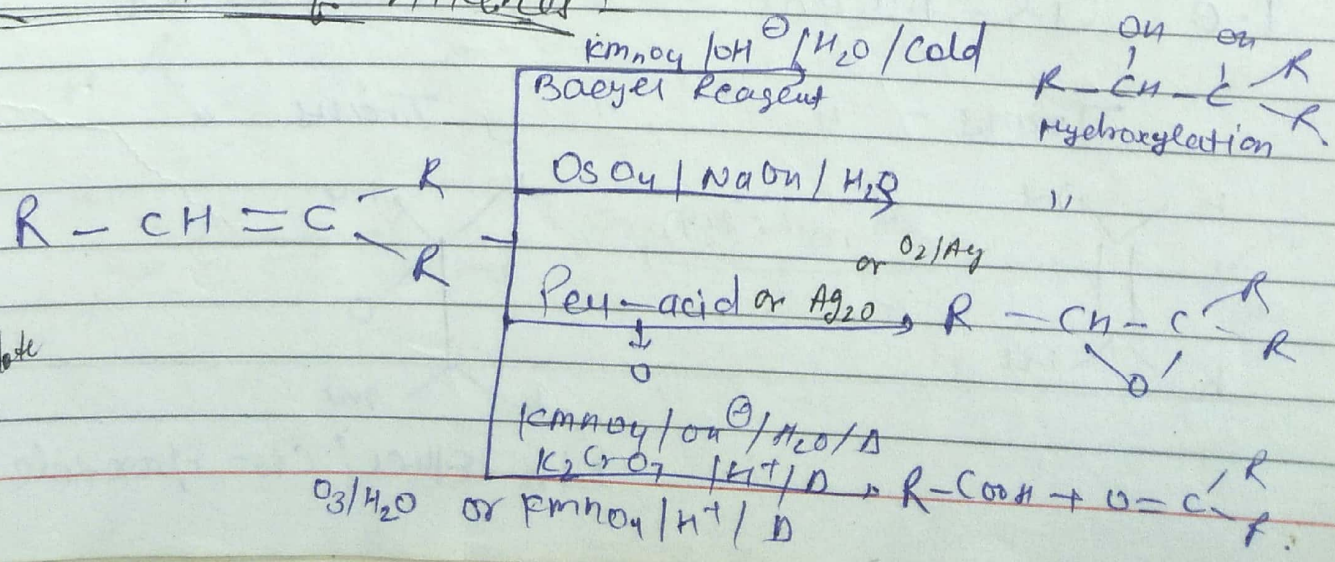
Alkene



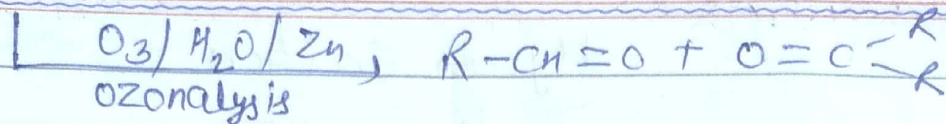
(2)



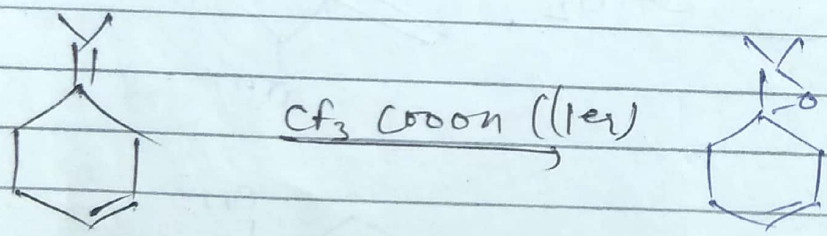
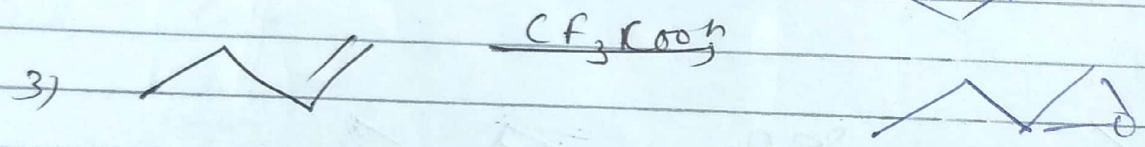
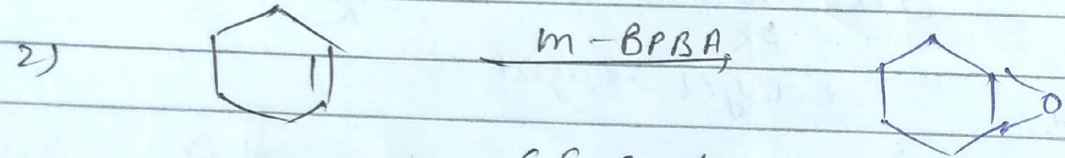
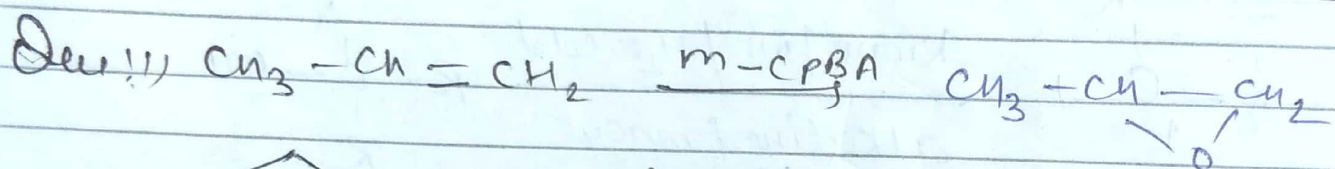
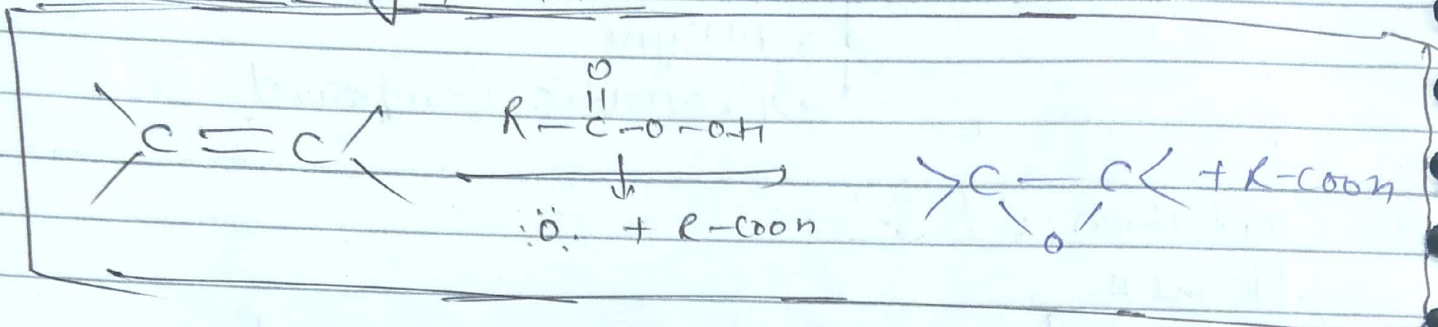
* Oxidation of Alkene



don't write this.

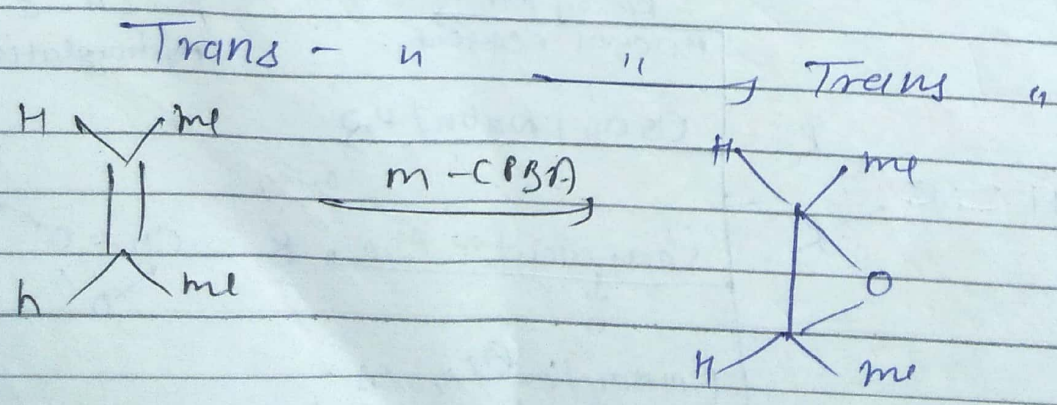


II Oxidation by peracid



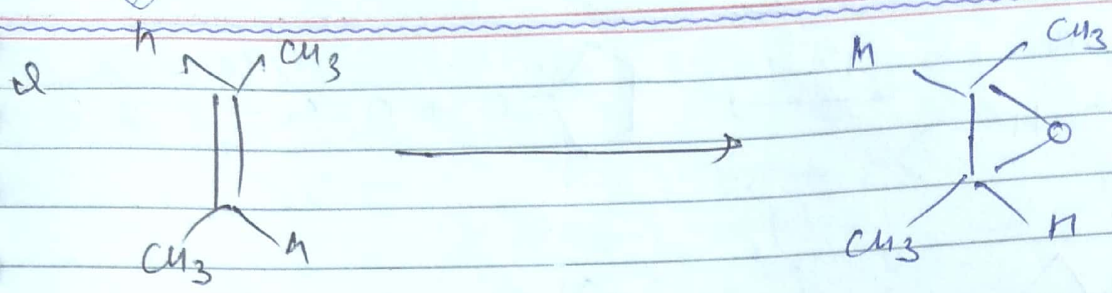
It is syn addition process

i.e. cis-alkene $\xrightarrow{\text{per-acid}}$ cis-ether



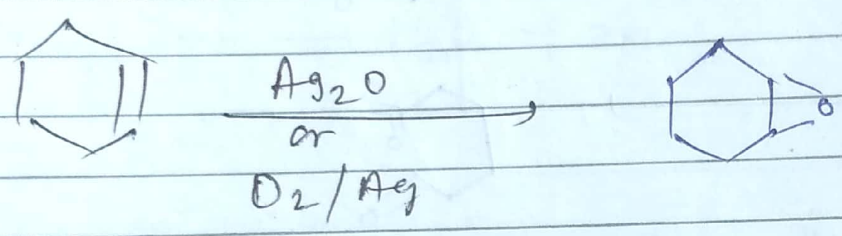
cis ether / cis-epoxide

Br. reagent
 CH_3



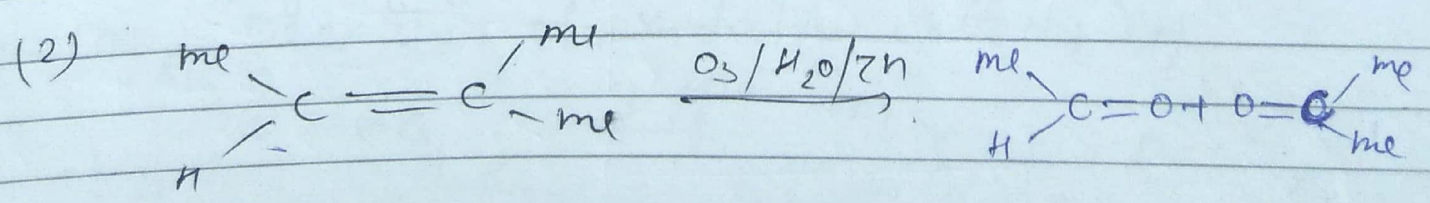
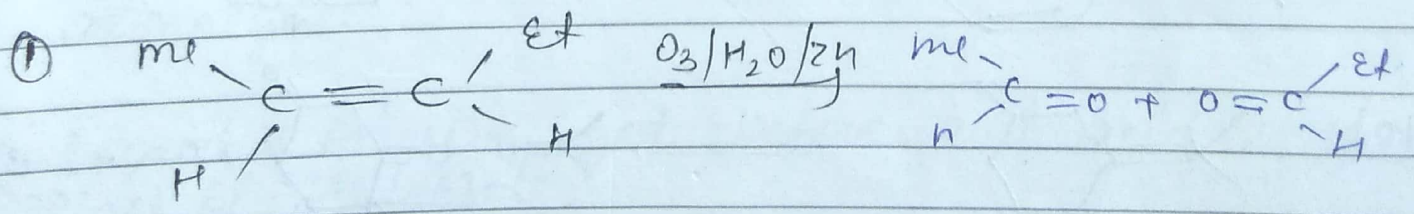
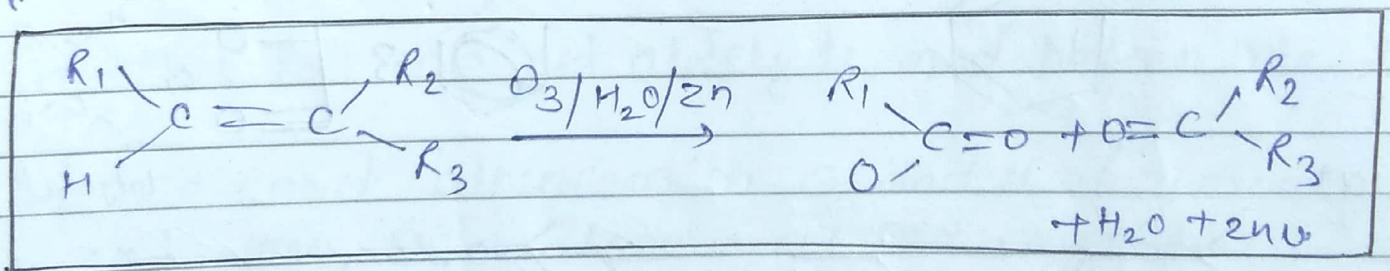
* Silver oxide do the same work as Per-acid

* Silver oxide (Ag_2O) or $\text{O}_2/\text{Ag} \perp$

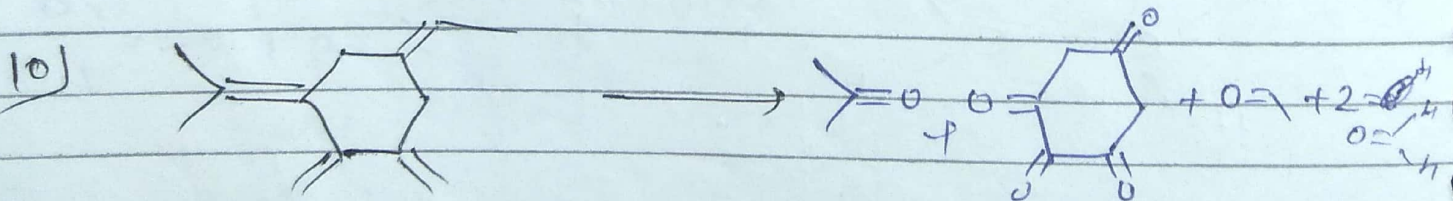
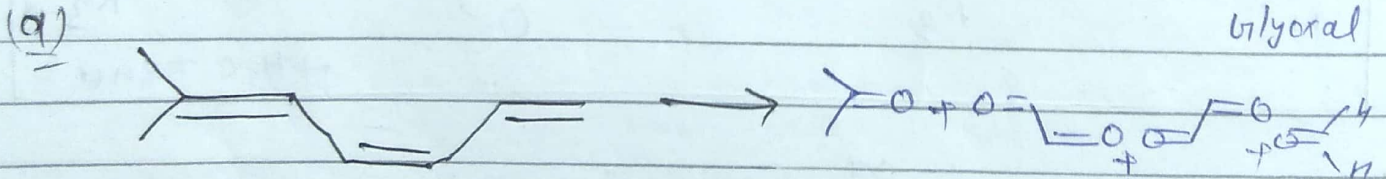
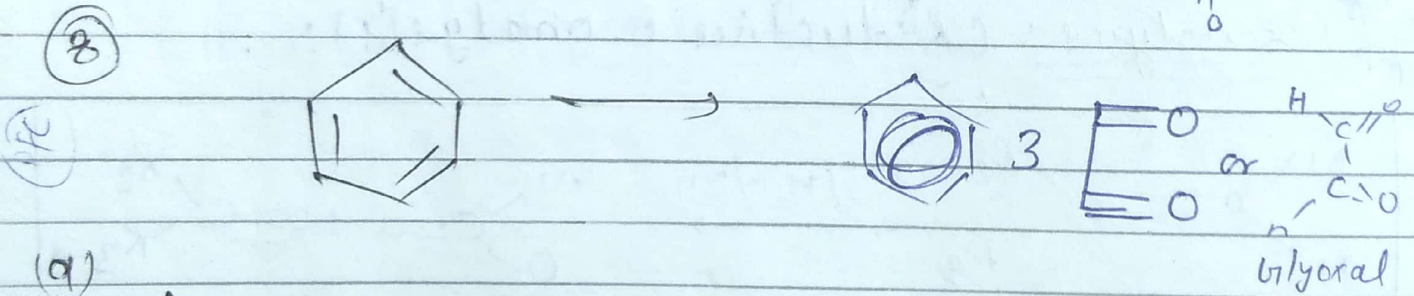
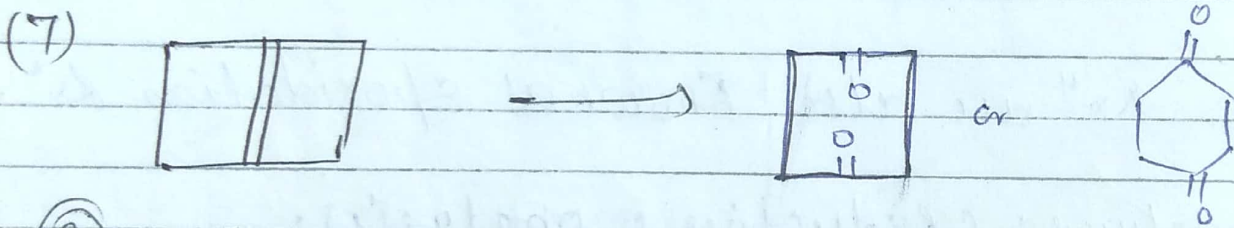
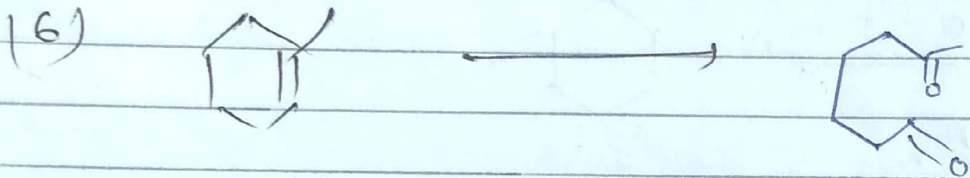
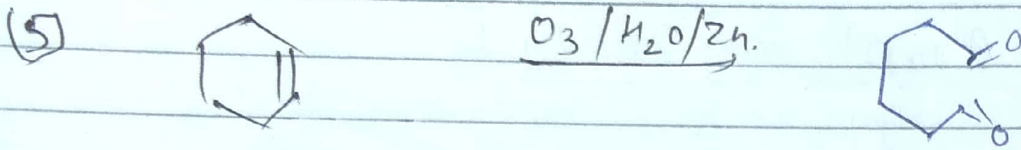
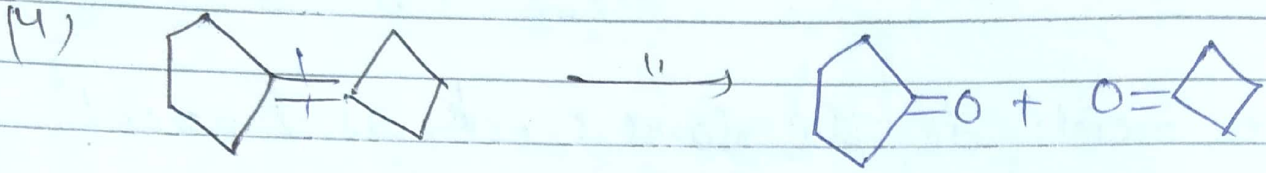
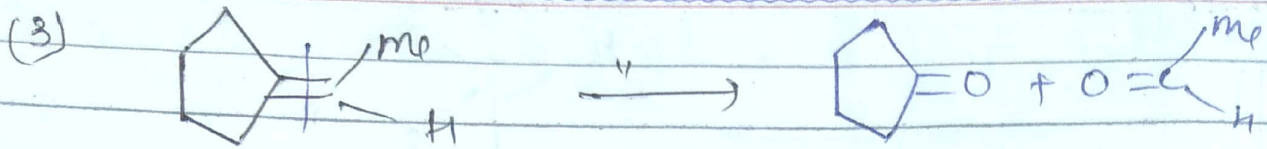


These Rxn are also known as epoxidation Rxn.

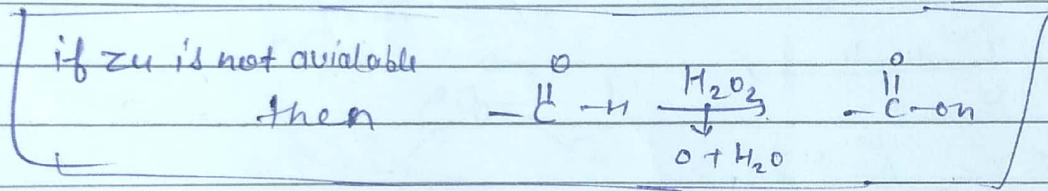
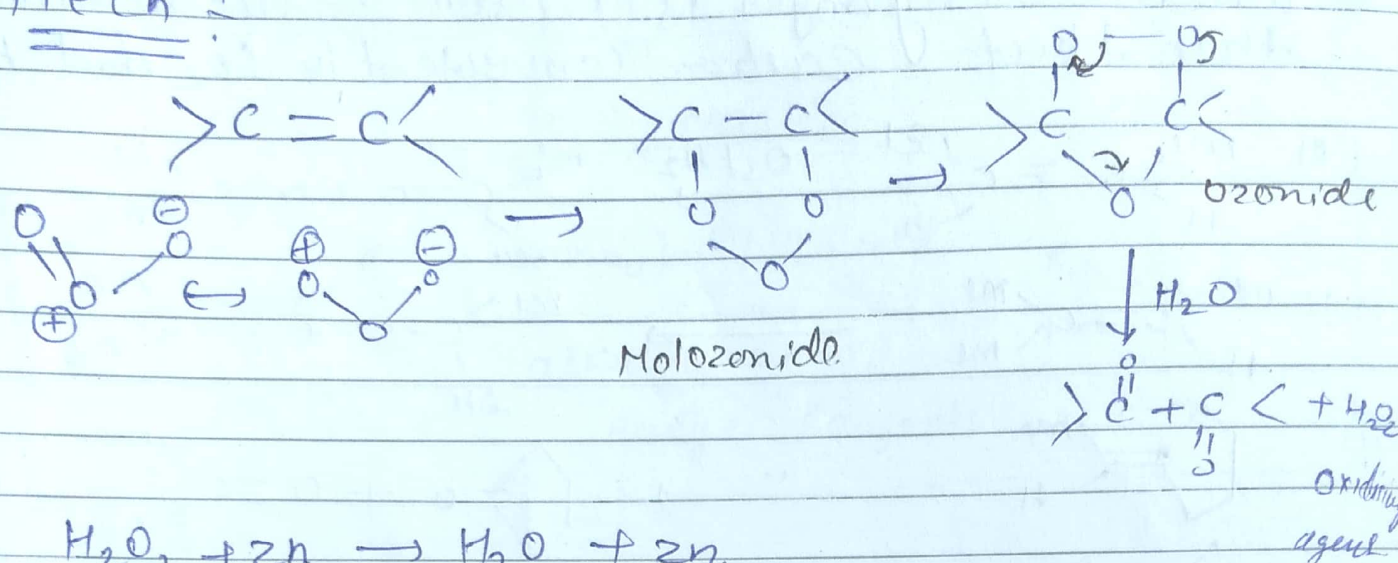
*** Ozonolysis: (Reductive ozonolysis):



AgNO_3
↓

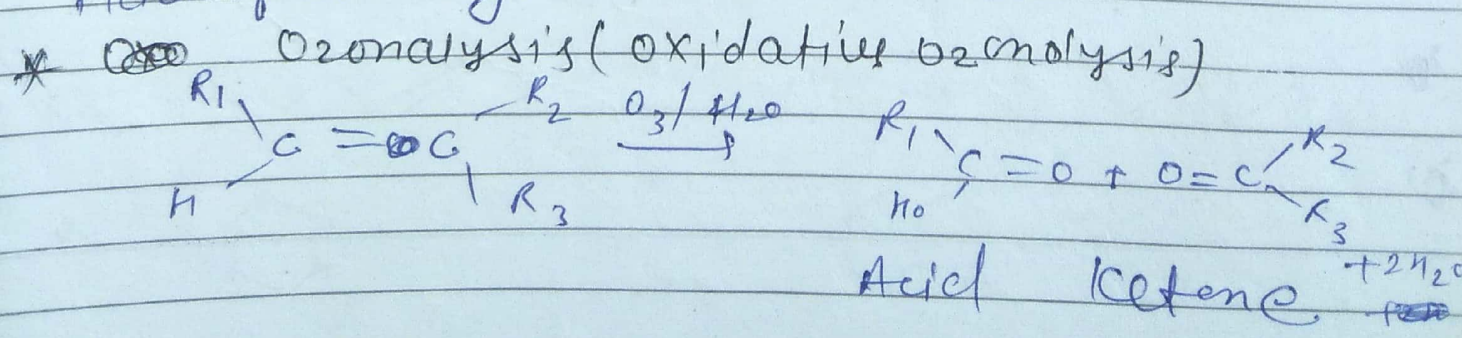


Mech^m!

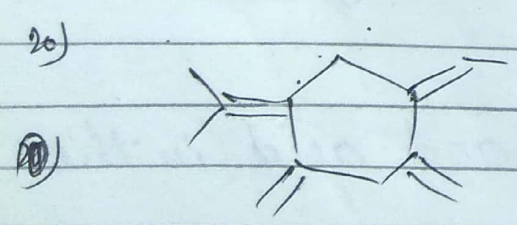
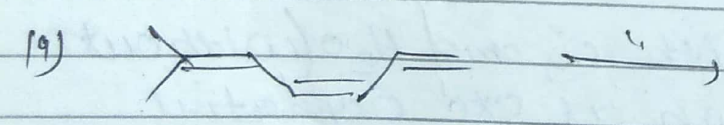
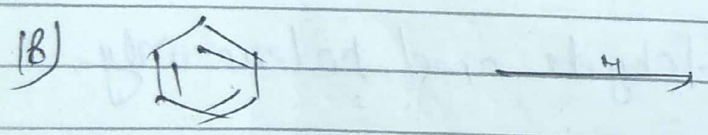
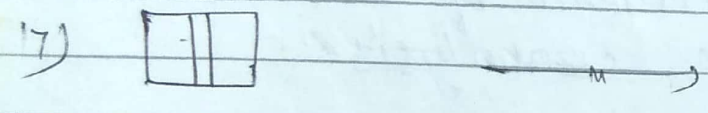
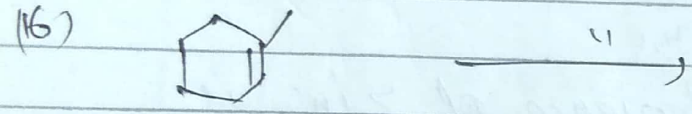
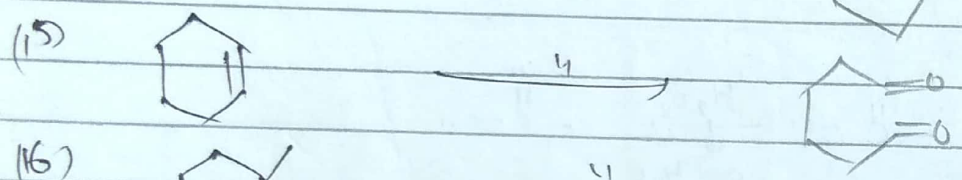
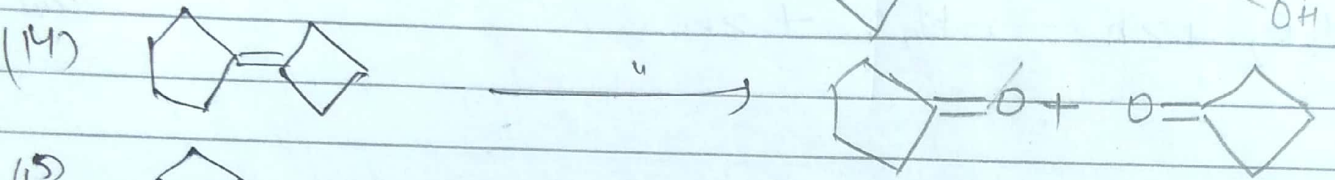
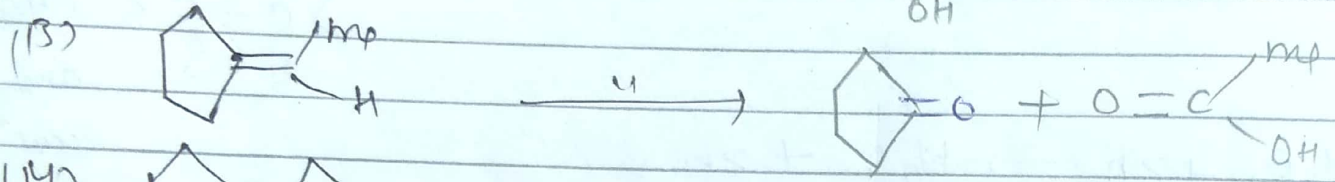
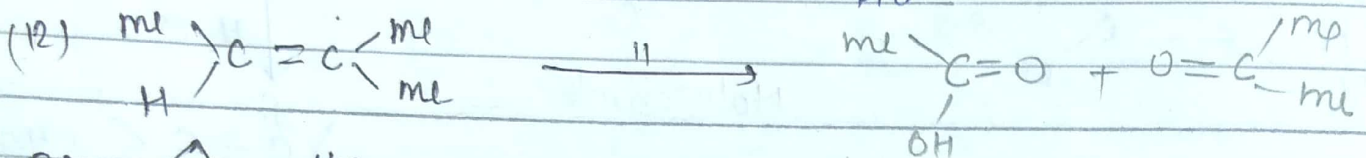
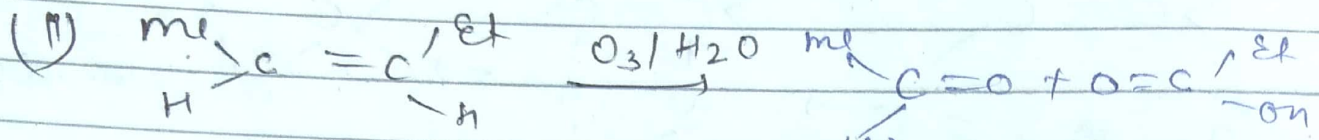


- * the ozonolysis in the presence of zinc is known as Reductive ozonolysis
- * In this rxn we get aldehyde and ketone only.
- * If we react alkene with O₃ and H₂O (without zn) then rxn is known as ~~old~~ oxidative ozonolysis.

In this rxn we get ketone and acid in the place of aldehyde.



* When two hydrogen is present on alkene carbon then that carbon converted in CO_2 and H_2O



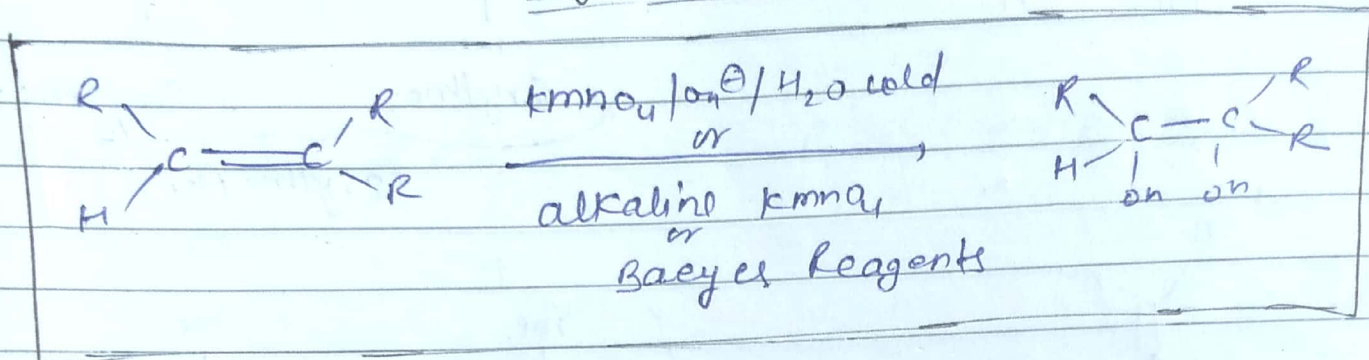
(21)

(22)

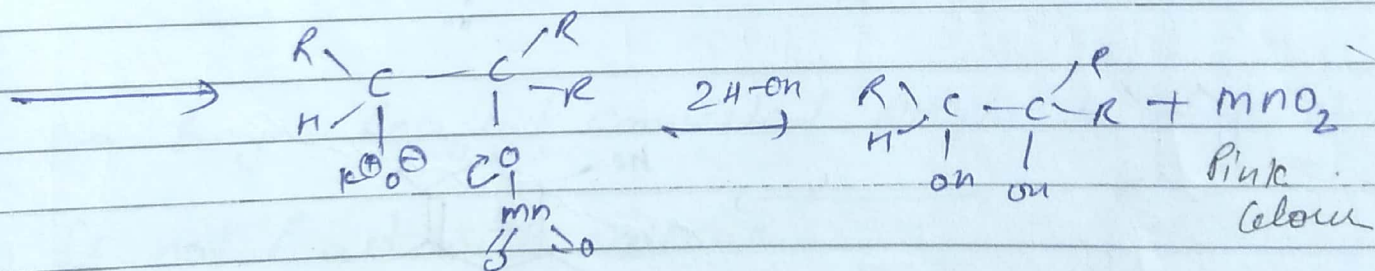
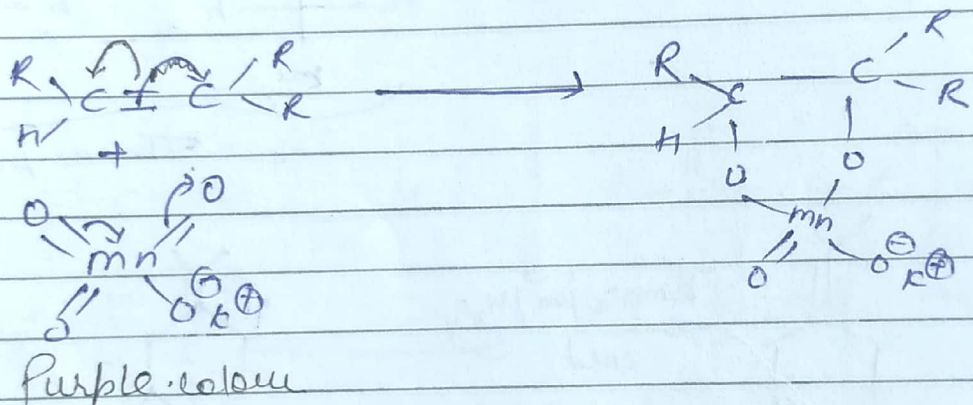
(23)

* Oxidation by $\text{KMnO}_4 / \text{OH}^- / \text{H}_2\text{O}$: (Baeyer Reagent)

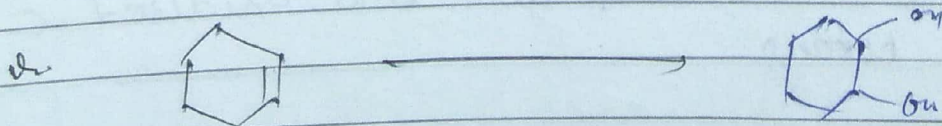
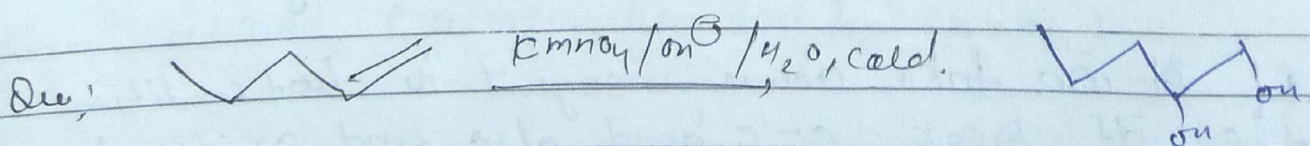
Hydroxylation

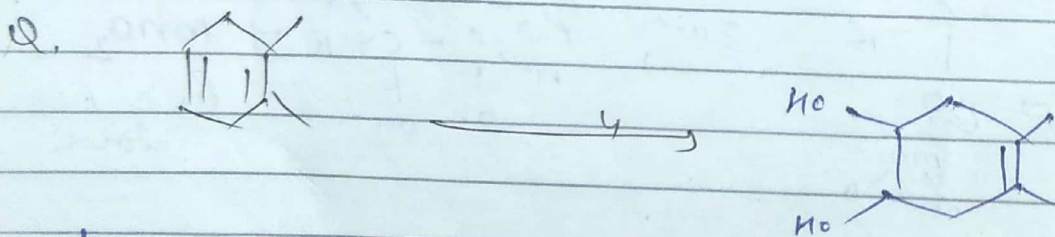
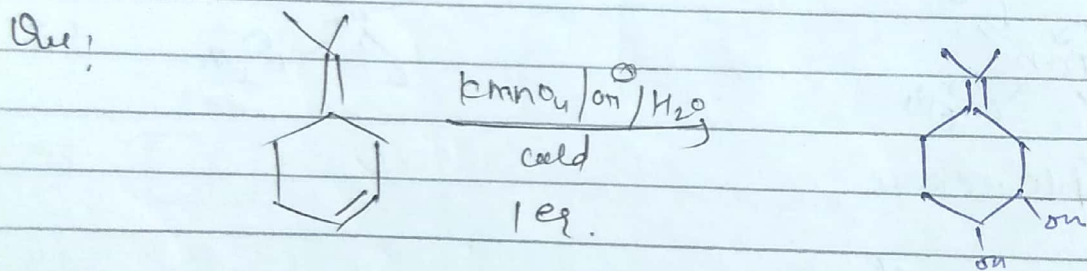
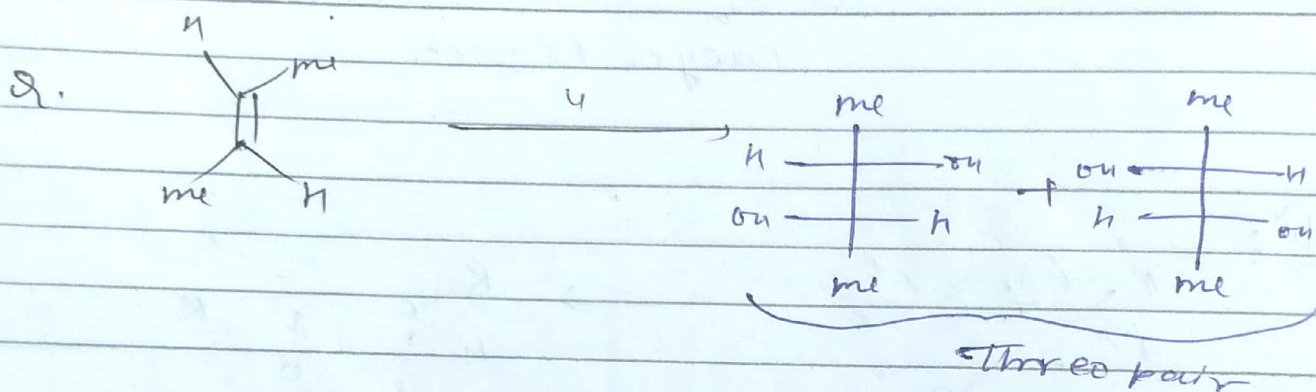
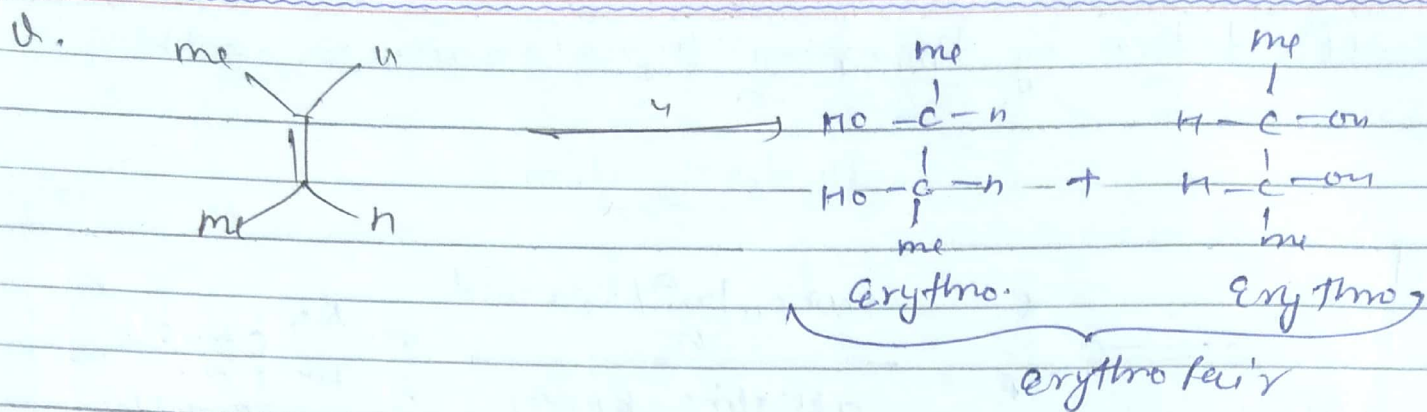


Mech:



- Syn Addition process
 Cis-Alkene - erythro
 Trans - Threo.

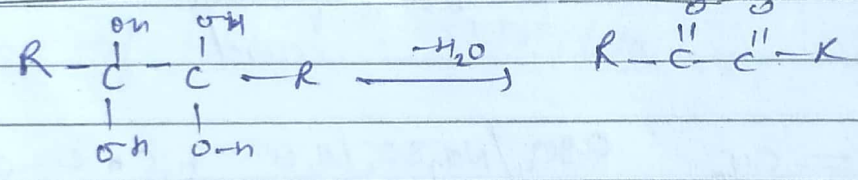
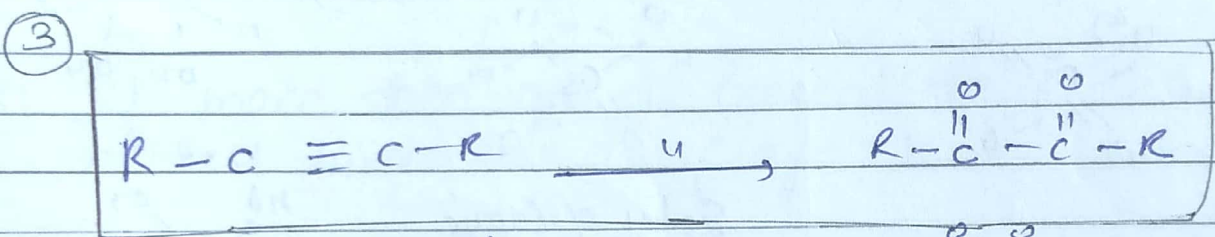
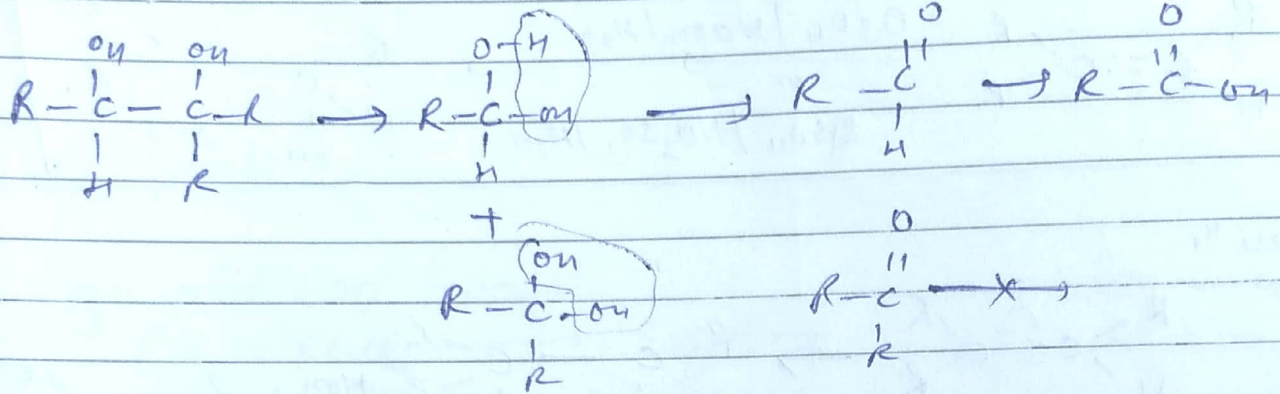
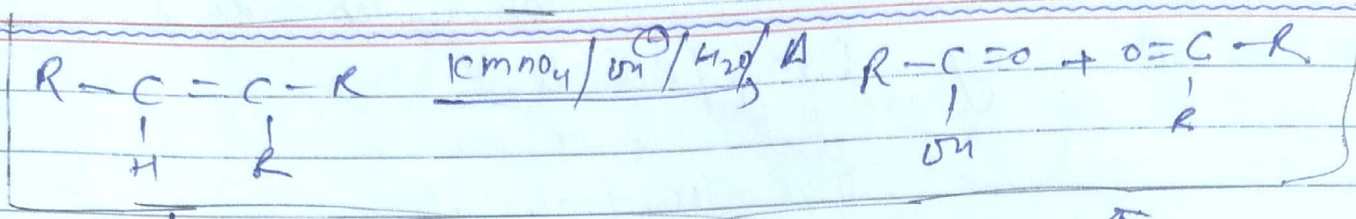




Note!

(1) If there are more than one d.b then it attack 1st on that double bond where crowding is less

2) If we take above reagent in hot condition then it break C-C bond also and oxidised -C to acid or ketone



④ Bayer Reagent converted Alkyne to 1,2-diketone.

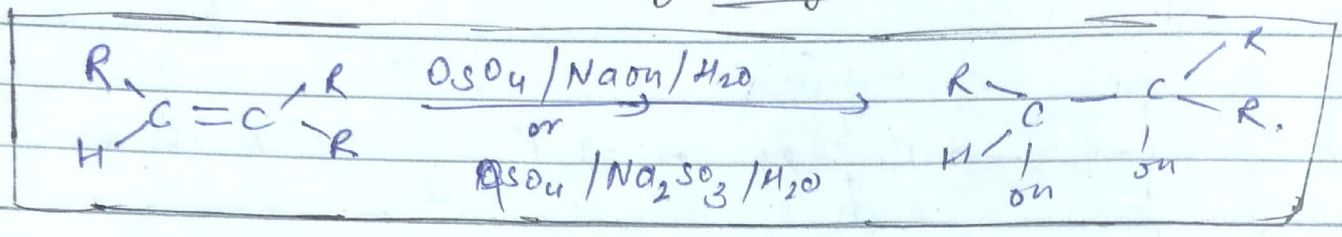
4) It not react with alkane

5) Alkene and Alkyne react with KMnO₄ and change its colour but not alkane therefore by the help of this Rxn alkene and alkyne can be differentiated from alkane (unsaturation test by KMnO₄).

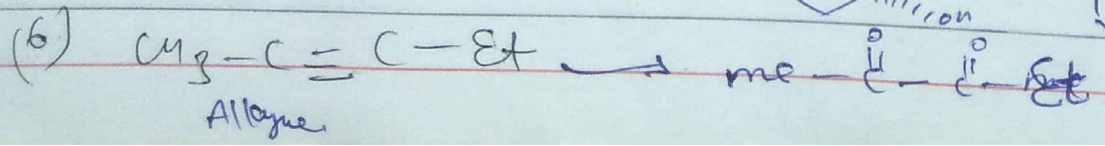
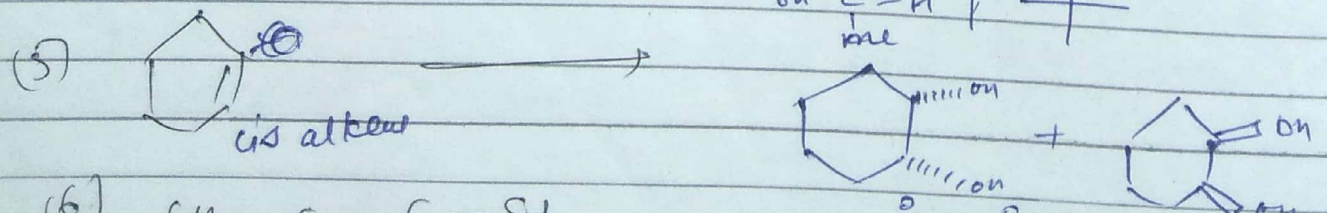
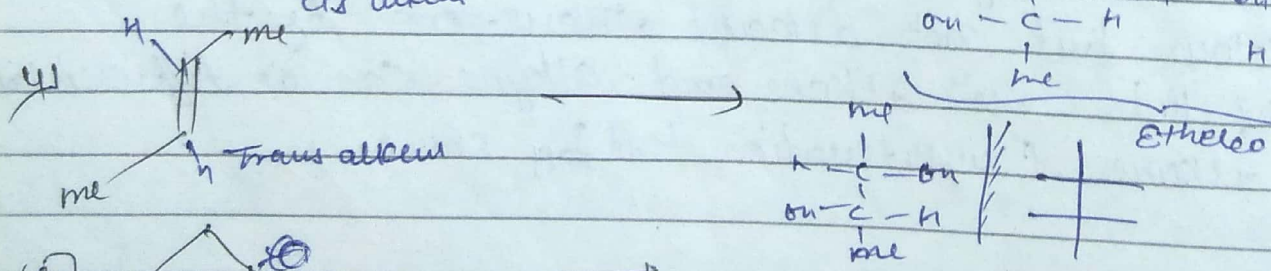
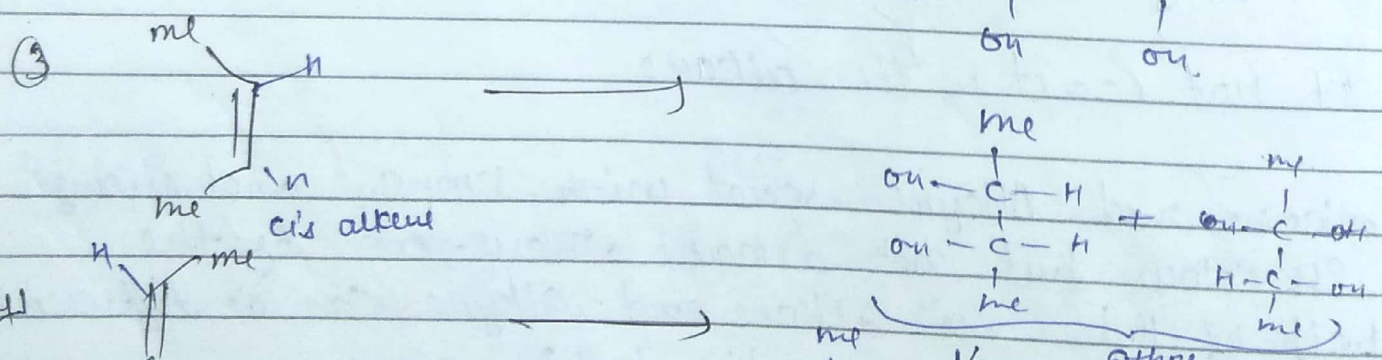
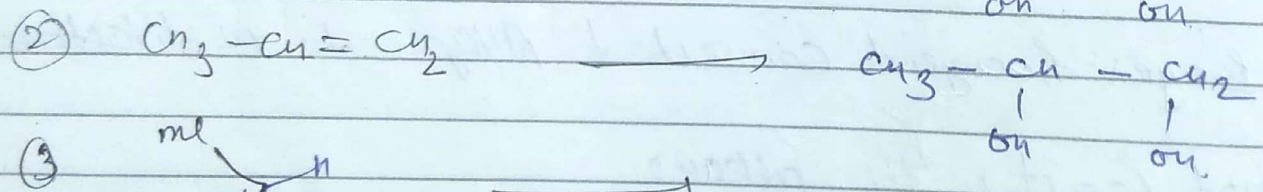
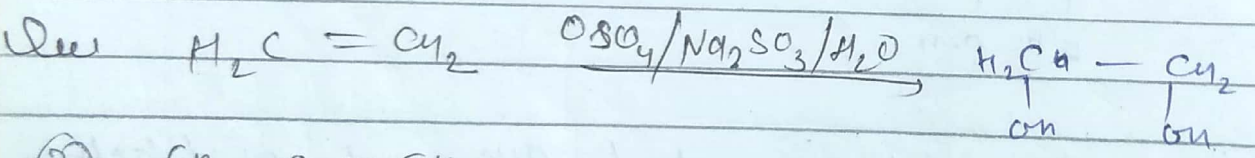
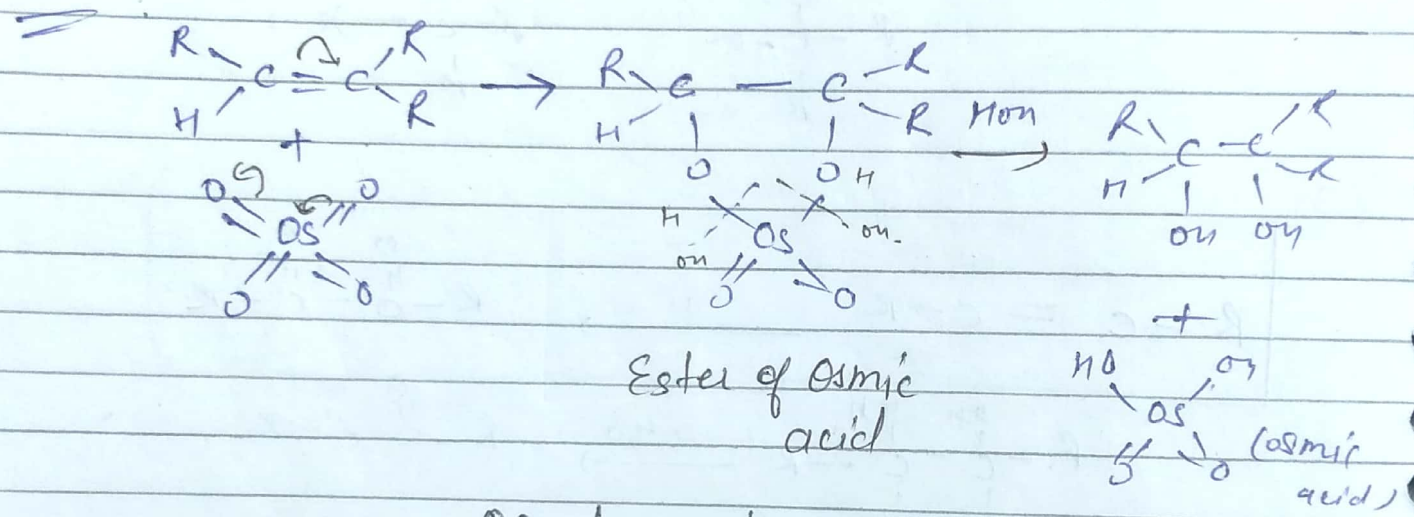
Osmium tetroxide

* Oxidation by $OsO_4 / \text{Base} / H_2O$
or

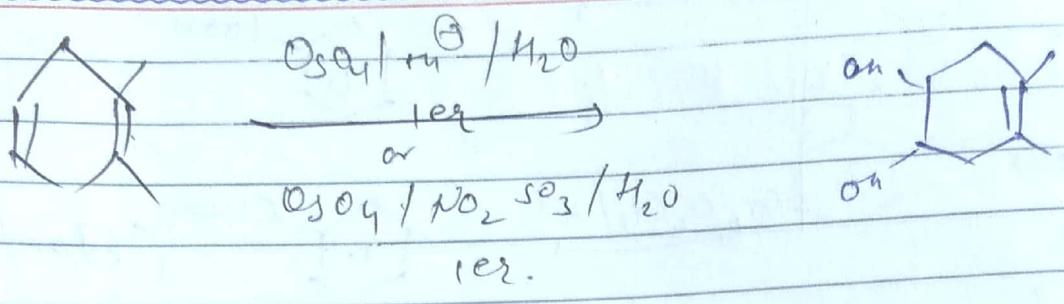
Hydroxylation



Mechanism



7

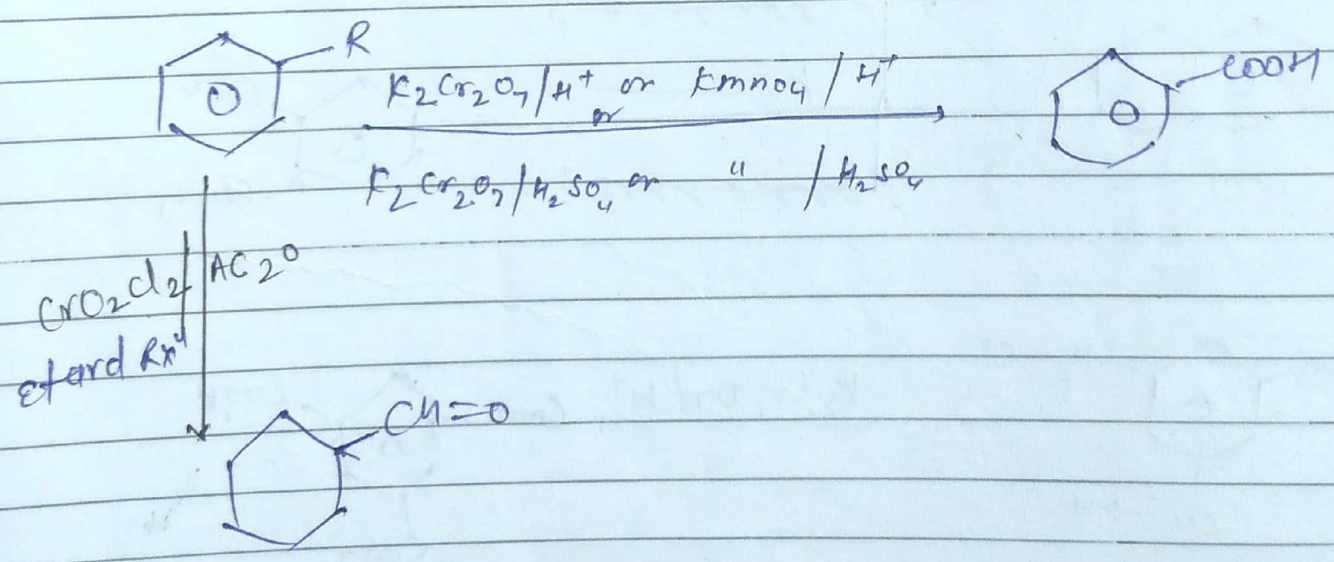


Key points :

- 1) Syn addition process
- 2) Cis alkene \longrightarrow Erythro
- Trans alkene \longrightarrow Threo

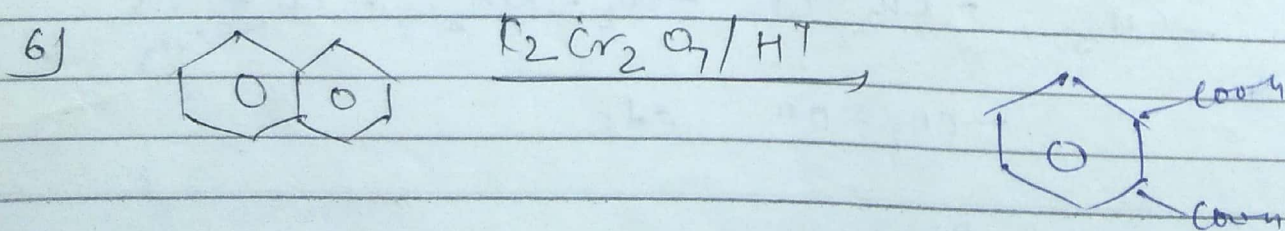
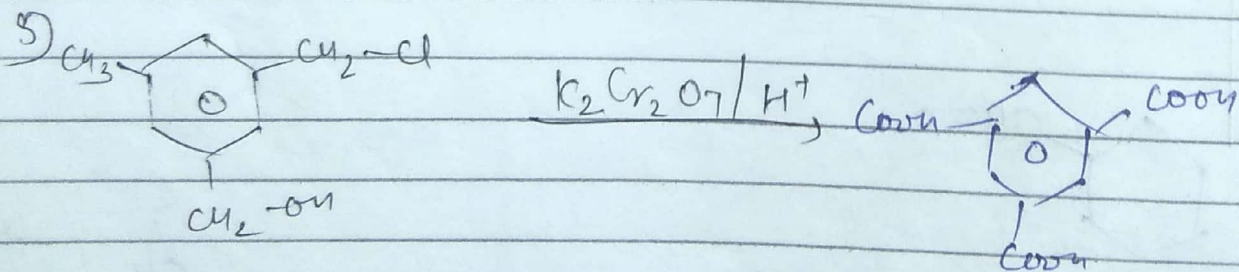
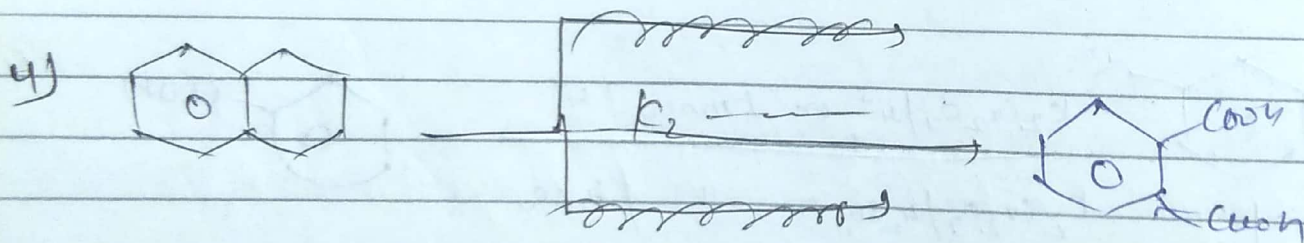
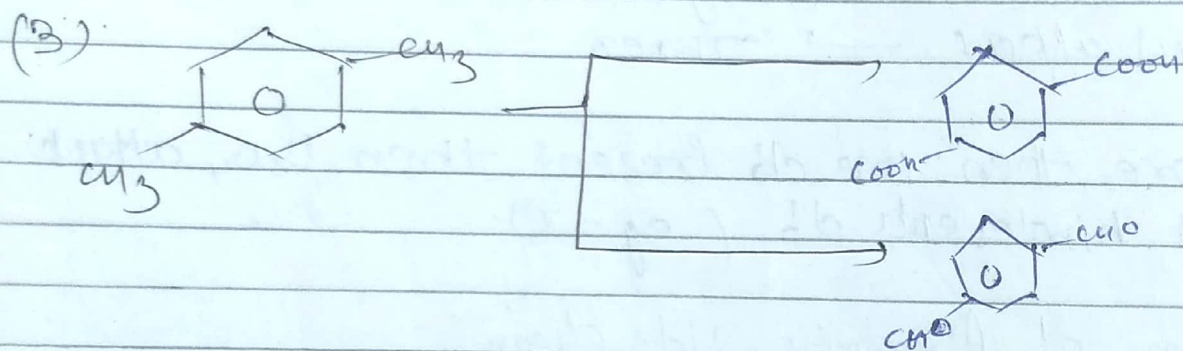
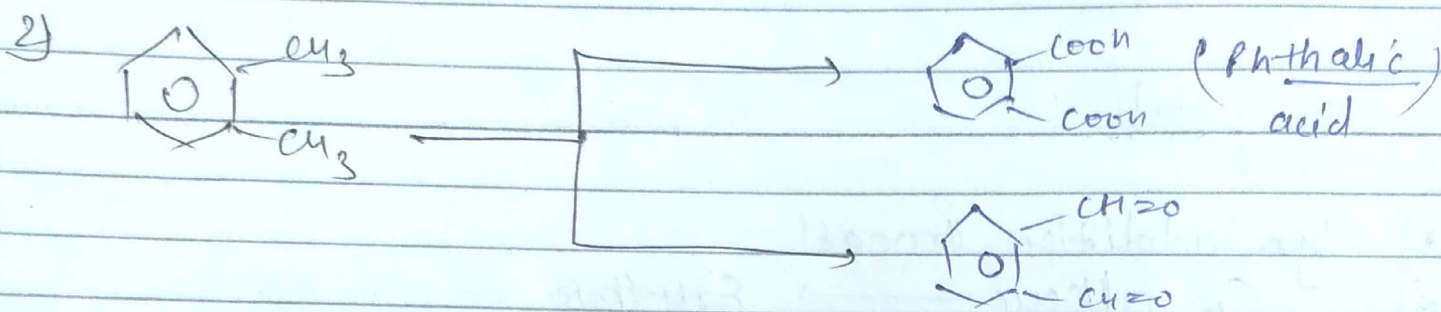
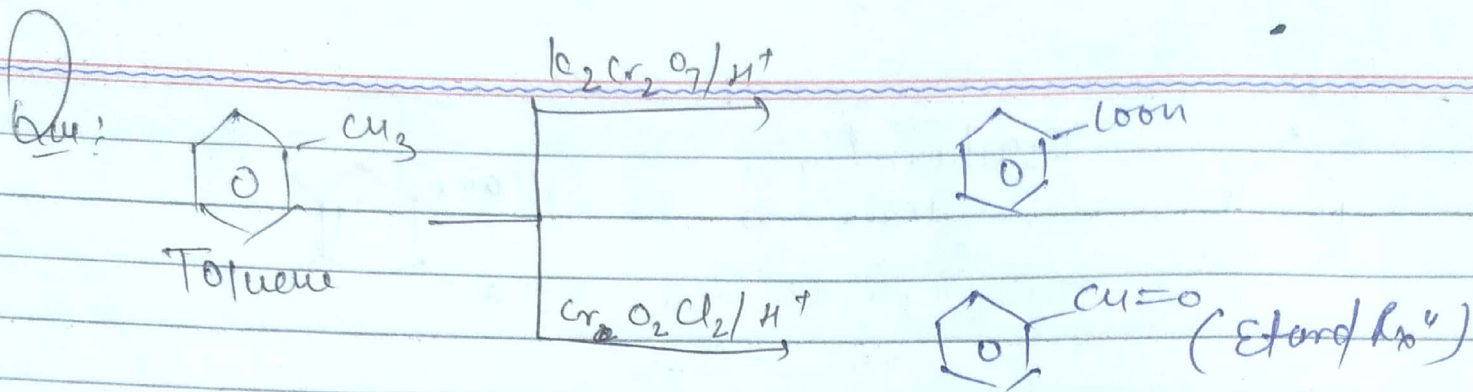
3] If more than one db present then OsO_4 attack on less hindered db (eg-7).

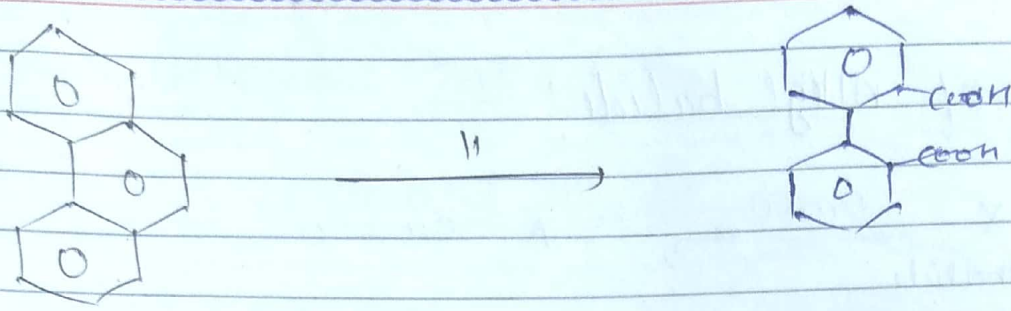
* Oxidation of Aromatic side chain!



$-R = -CH_3, -CH_2-Cl, -CH_2-NH_2, -CH(CH_3)_2$
 $-CH_2-OH, etc$

$-R \neq 3^{\ominus}R.$

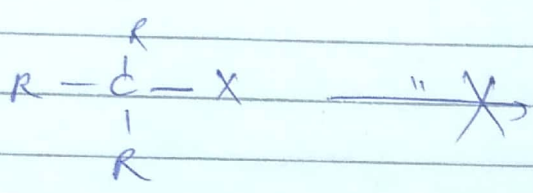
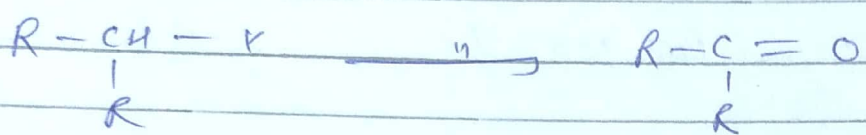
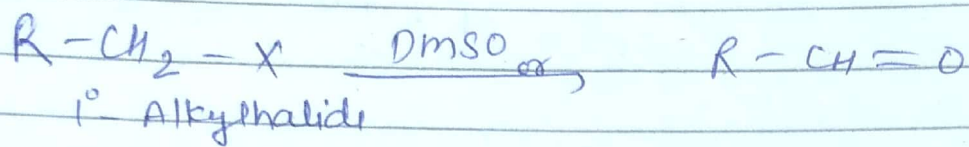




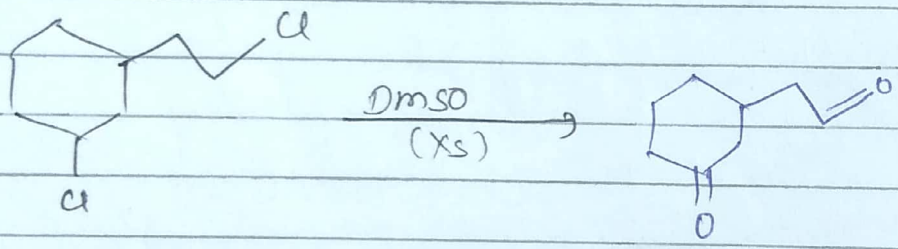
* Oxidation of A.C = 1 (Page No - 7)

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* Oxidation of Alkyl halide!



Que^o



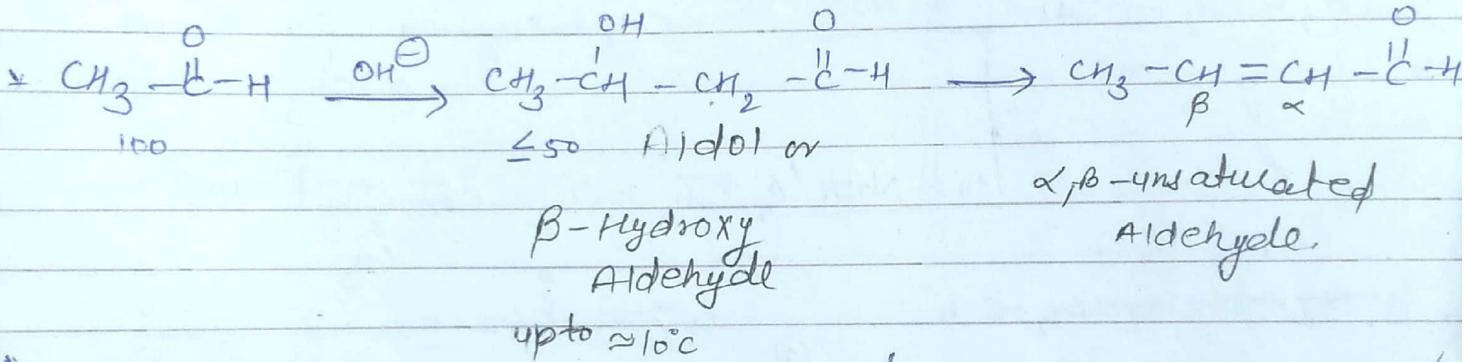
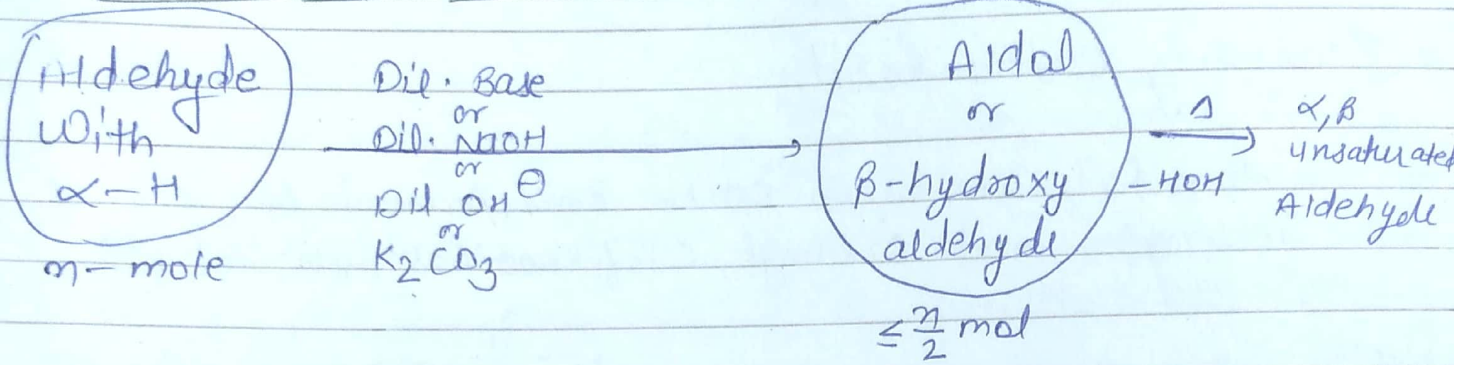
Homework

Complete oxidation should \Rightarrow
alcohol ether.

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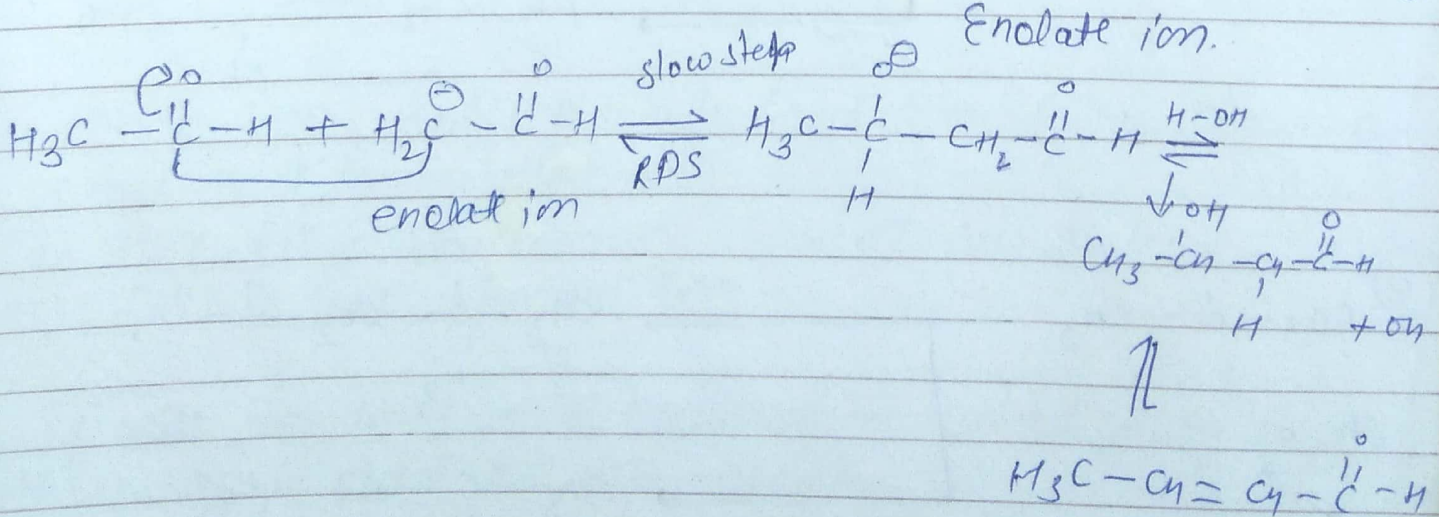
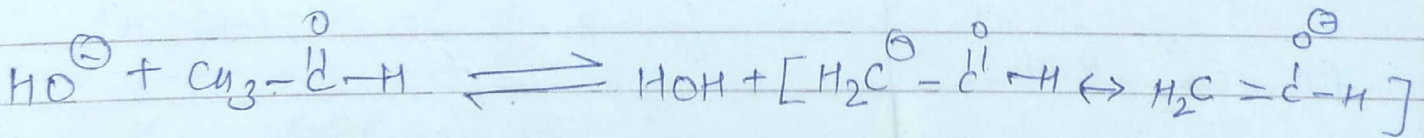
* Some Important name Rxⁿ:

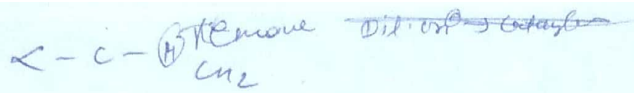
~~A~~
~~A~~
~~A~~
1) Aldol Condensation Rxⁿ:



Aldol Rxⁿ

ACR

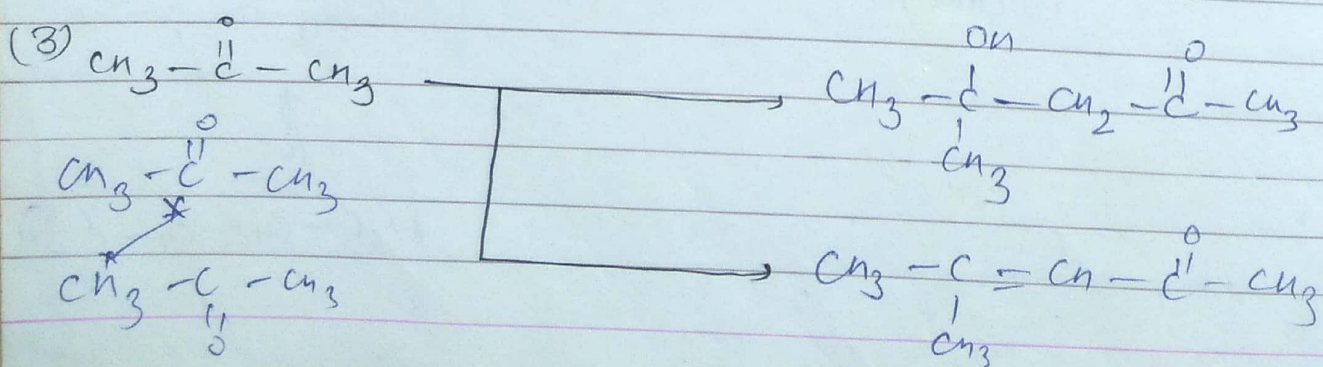
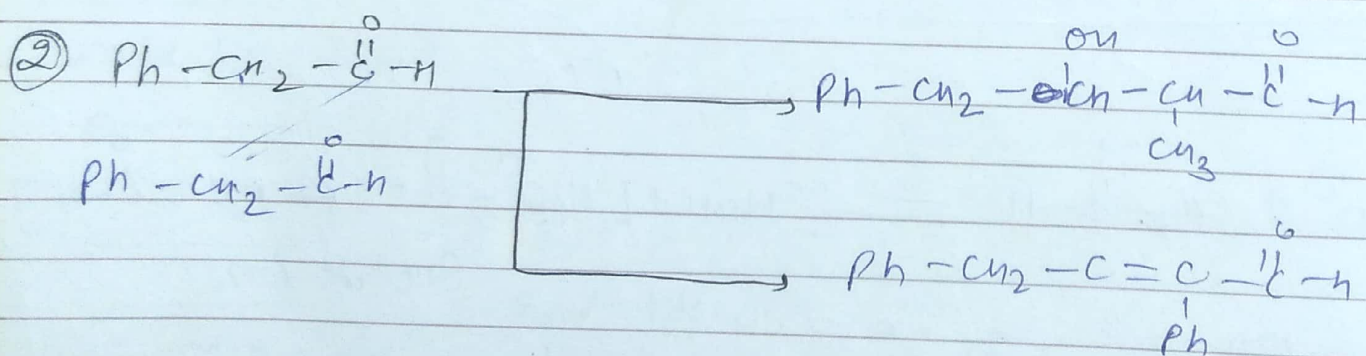
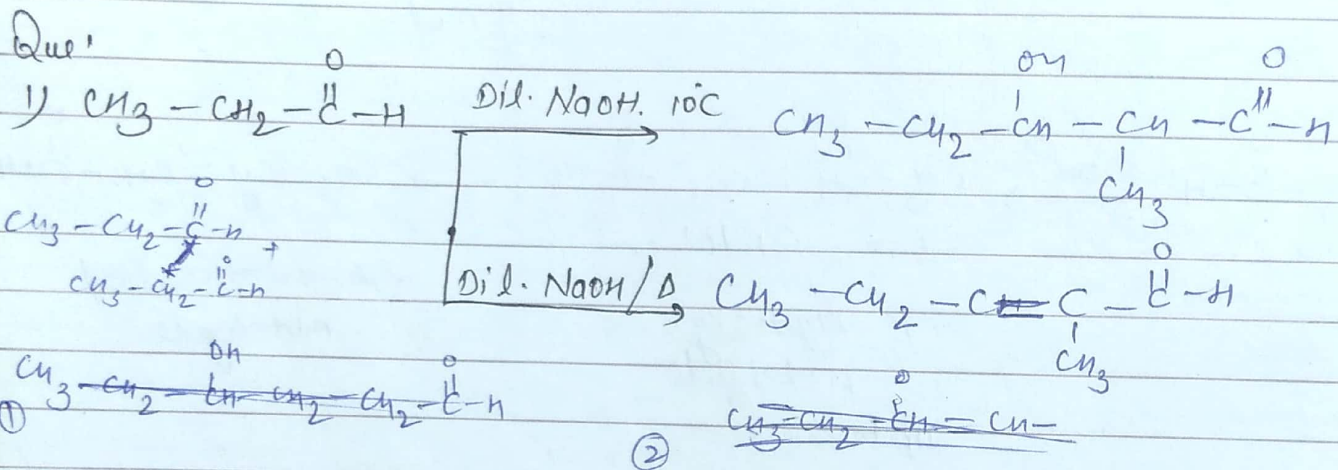




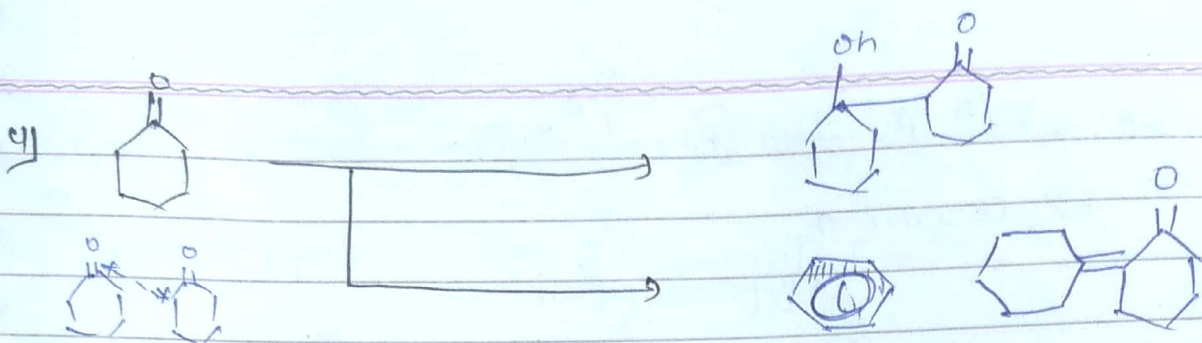
* In this Rxn product will Aldol if Rxn is carried out below room temp. and if Rxn is carried out at high temp. then product is α, β unsaturated aldehyde.

* Similarly ketone react

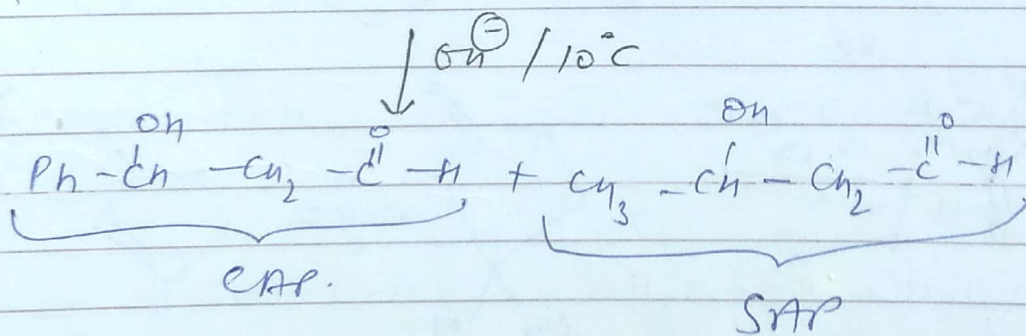
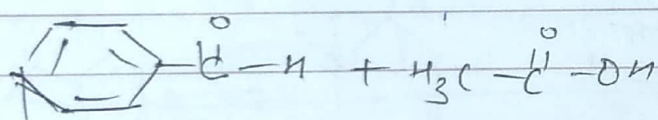
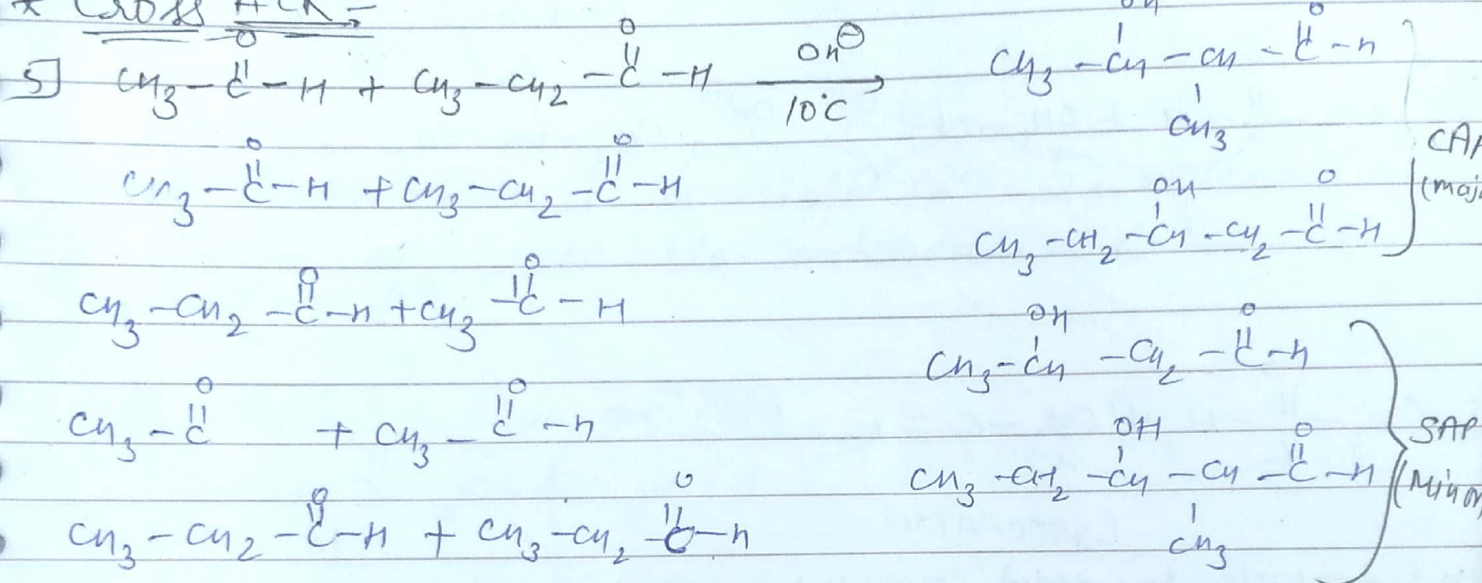
^{Imp} * In this Rxn new carbon-carbon bond formed b/w α C of one molecule and carbonyl C of another molecule:



OH always on β



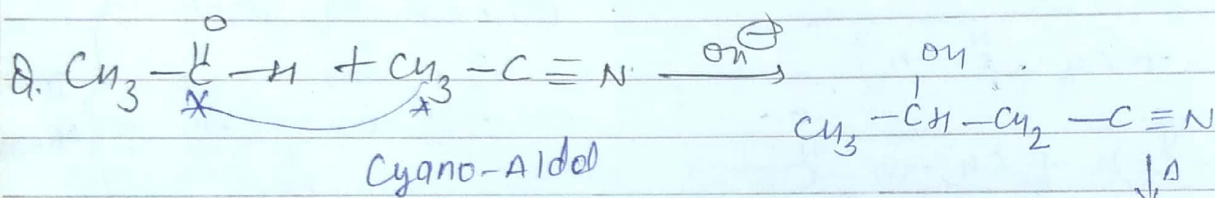
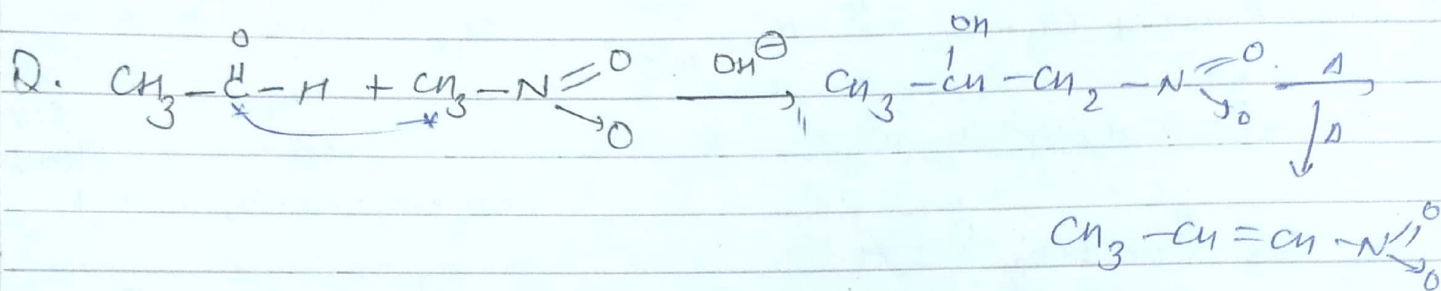
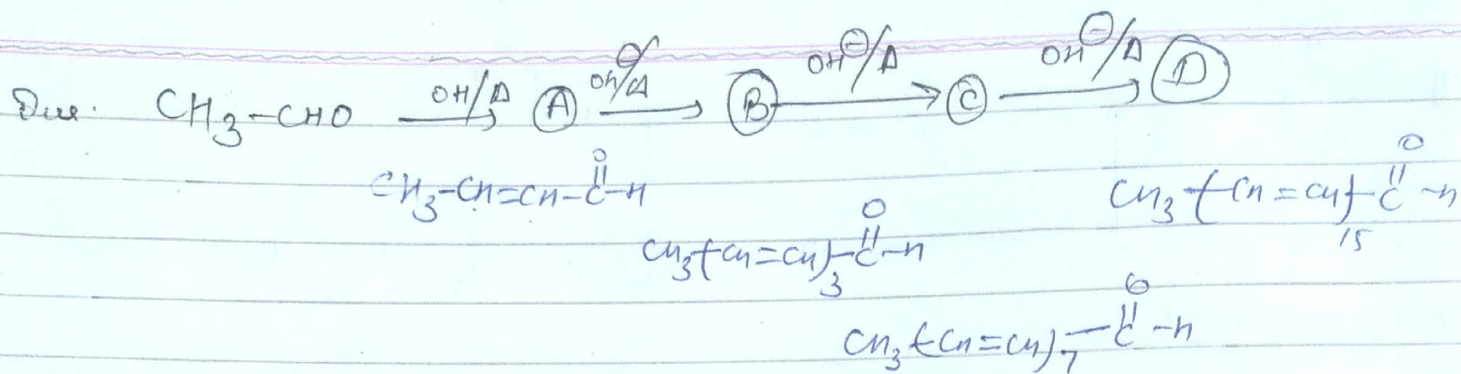
* Cross Aldol :-



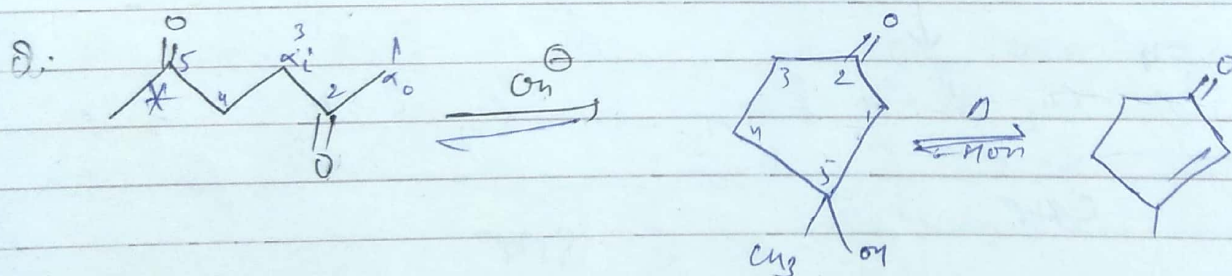
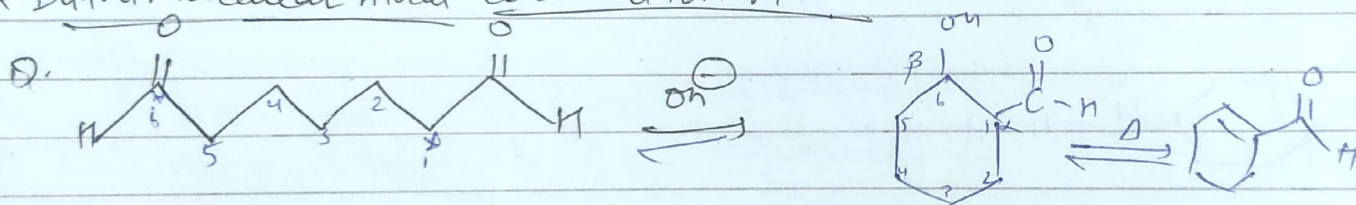
* When two diff. Aldehyde react then Rxⁿ is known as cross Aldol Condensation Rxⁿ

In this Rxⁿ more than one product are formed therefore this Rxⁿ is less important Rxⁿ.

* if ~~will~~ ^{we} ~~can~~ treat aldol condensation product with Base then again aldol Rxⁿ may occur.



* Intramolecular Aldol Condensation Rxn



* When two aldehyde or two ketone or one aldehyde or one ketone gp presenting same molecules then on treating with alk. base IMACR may occur and we get cyclic compound.

5-6
HR

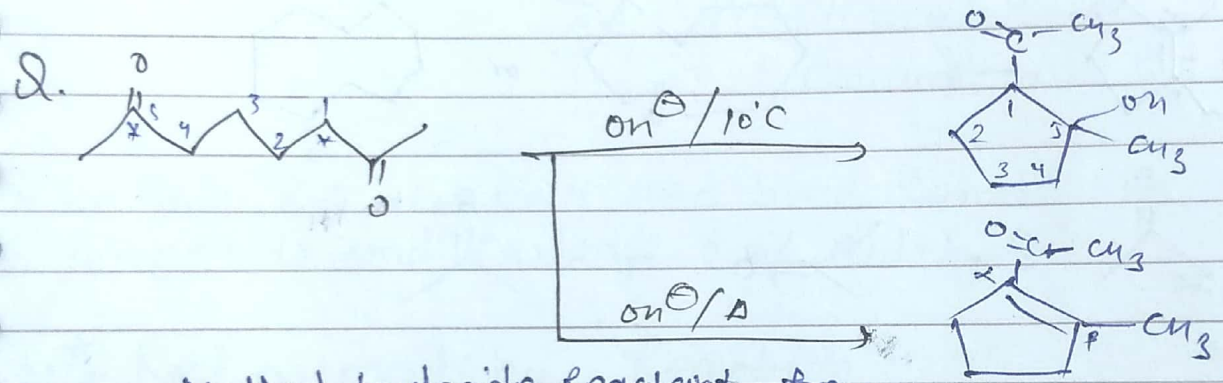
β -H.
2-H.

Rate = Reactant.
H.W. → all Q. of Aldol Condensation Lie from sheet

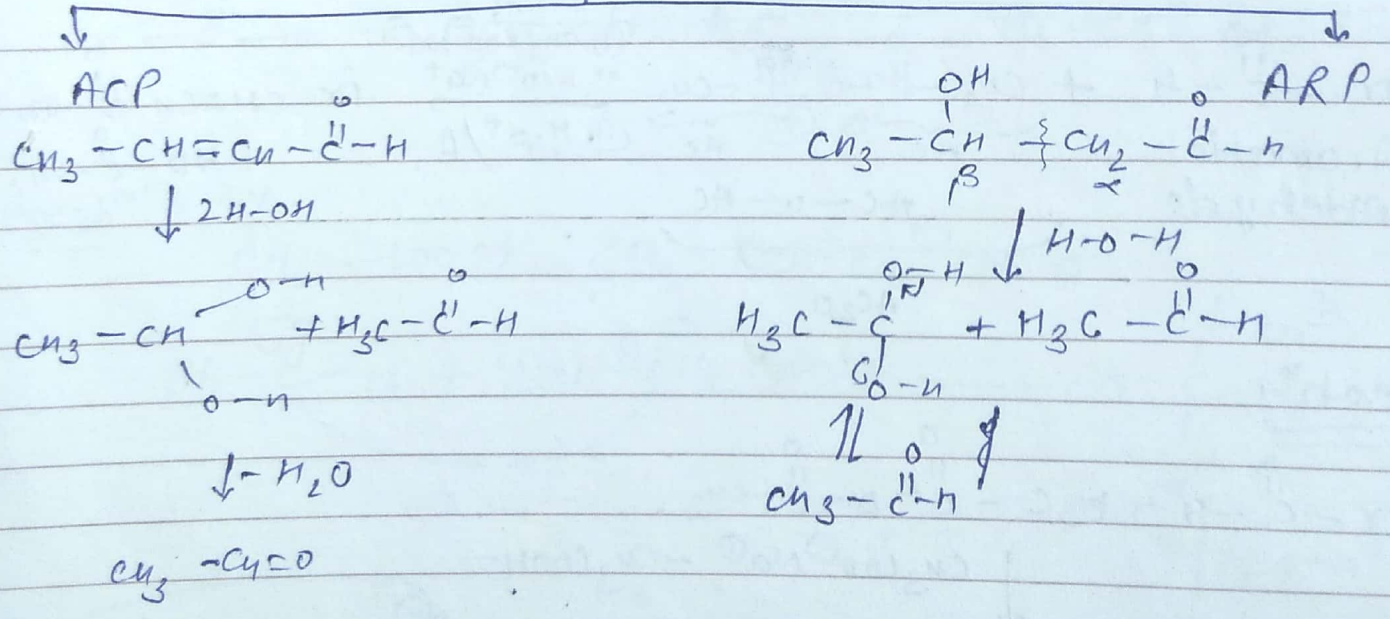
Rate of Rxn 'R' \propto $[CH_3-C(=O)] [CH_2^{\ominus}-C(=O)]$
 $\propto [CH_3-C(=O)]^2 [OH^{\ominus}]$

Order = 2
 molecularity = 2

* Aldol condensation is reversible Rxn its reverse rxn is known as retro aldol condensation Rxn.



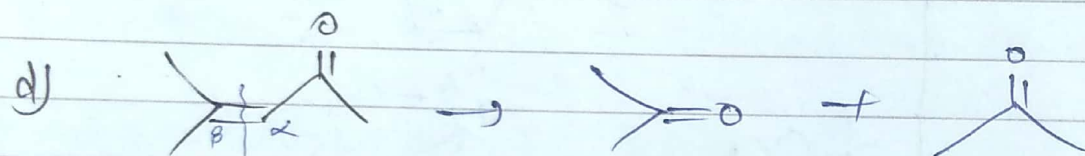
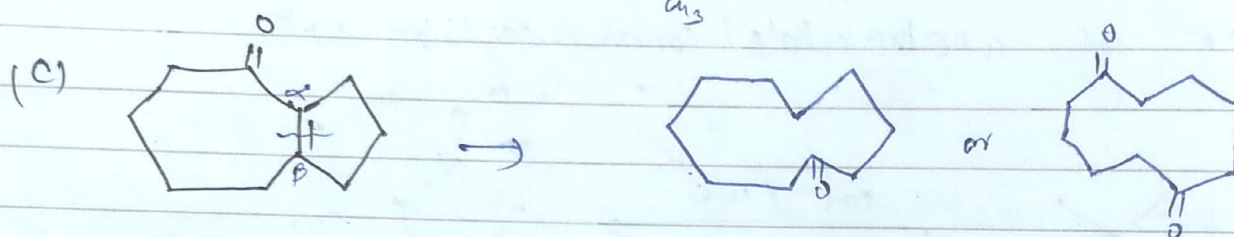
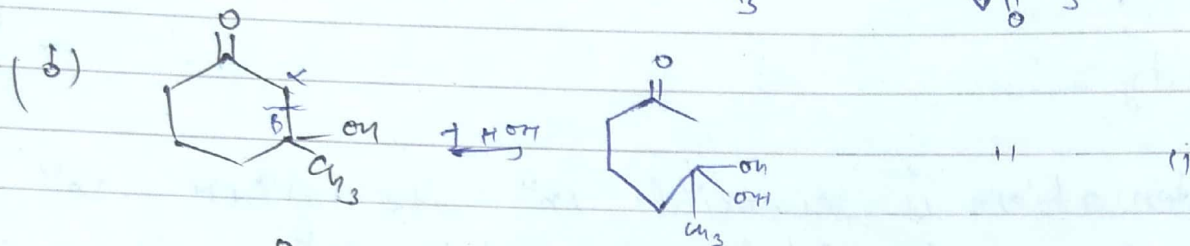
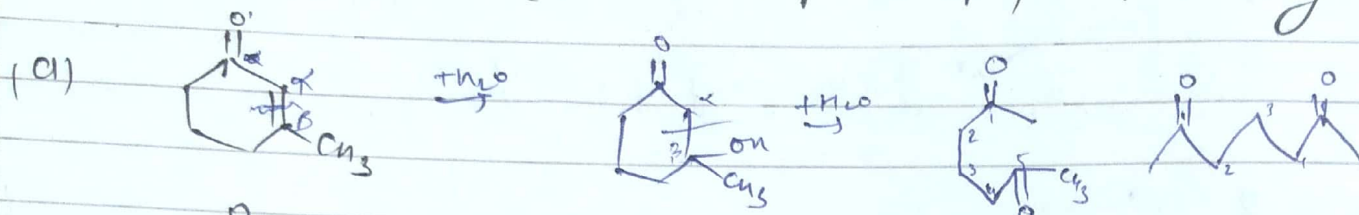
Method to decide Reactant from Aldol Product



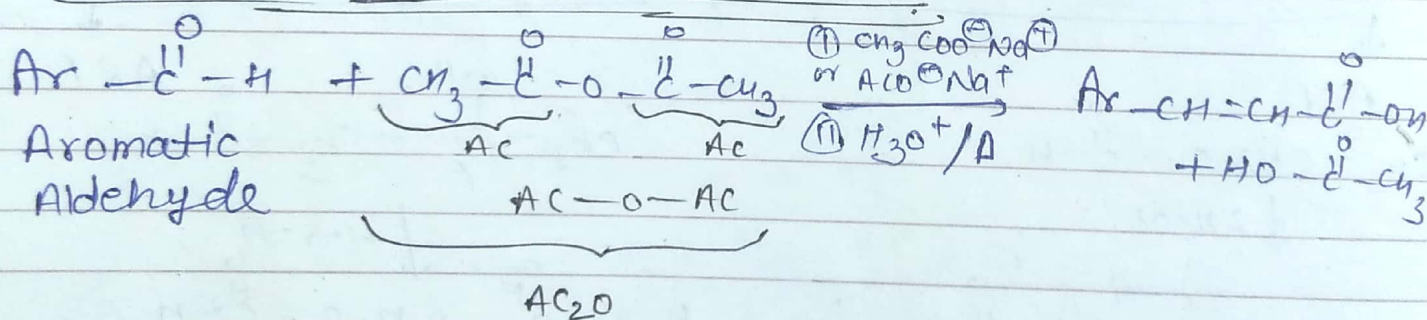
Add 'H' on C α
 Add 'OH' on C β
 Break bond C α & C β

H added
B on acetal

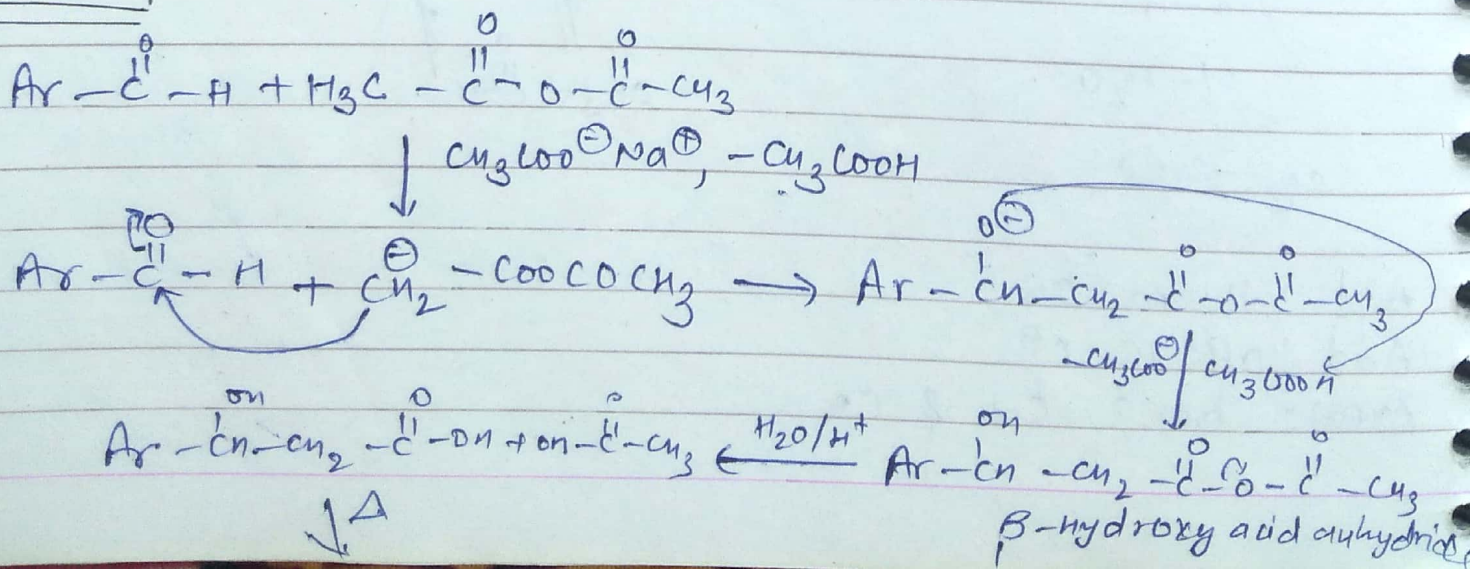
Q Decide Reactant (Retrosynthetic) product for following compound.

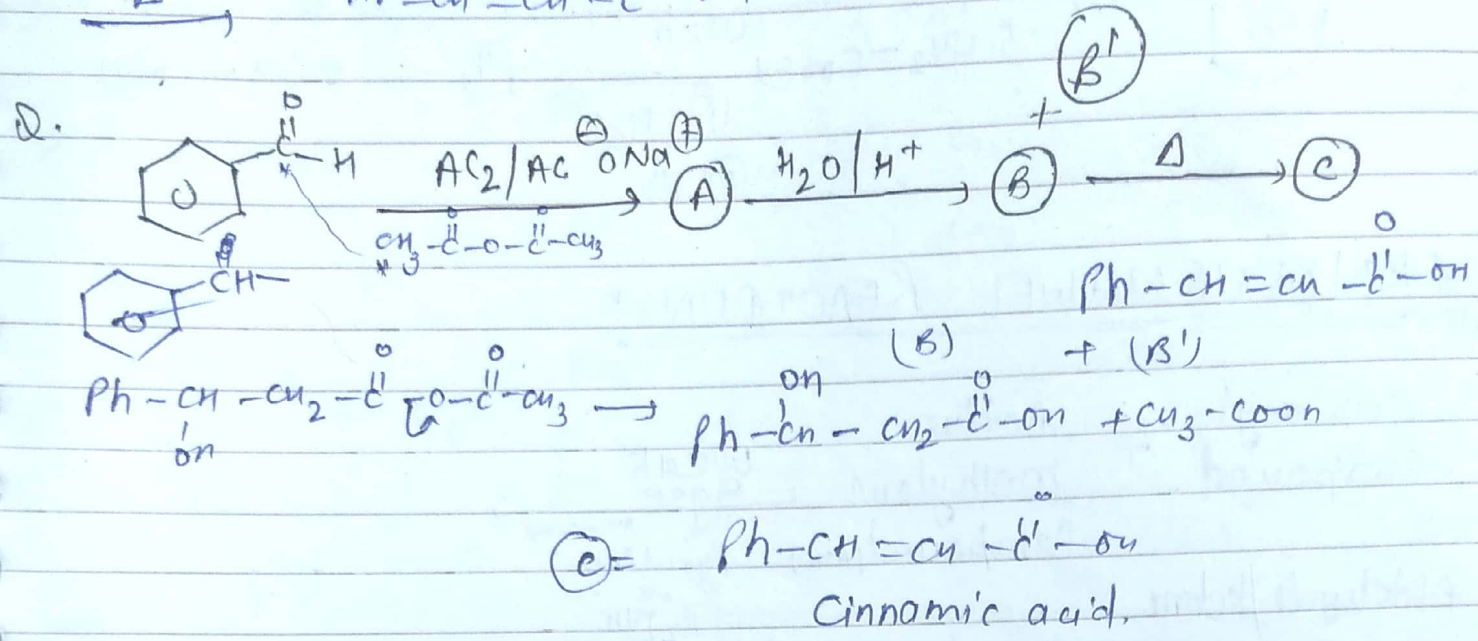
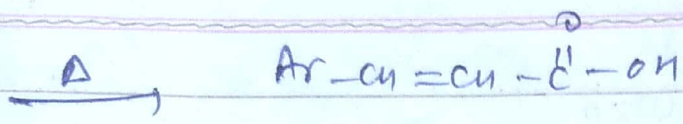


* Perkin Condensation Rxn



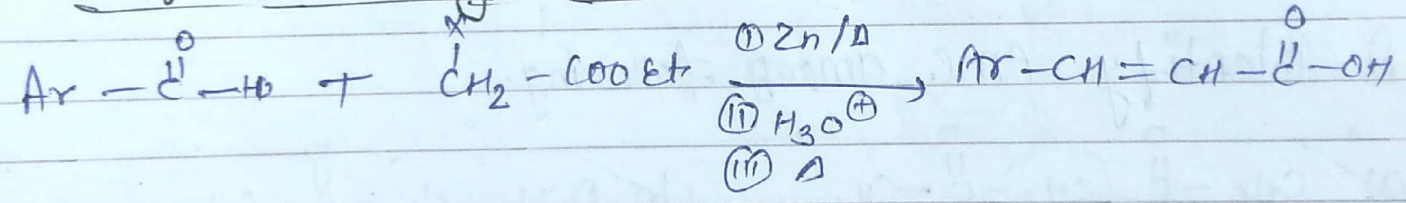
Mech:



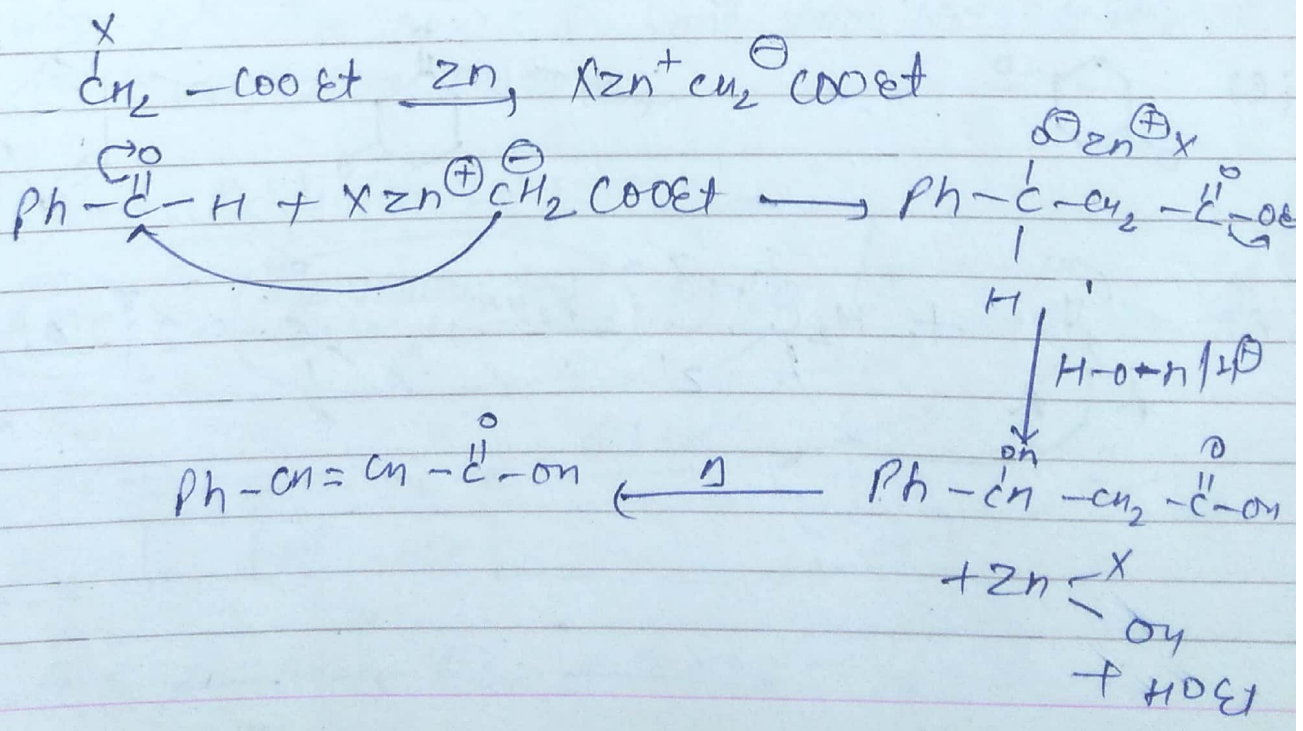


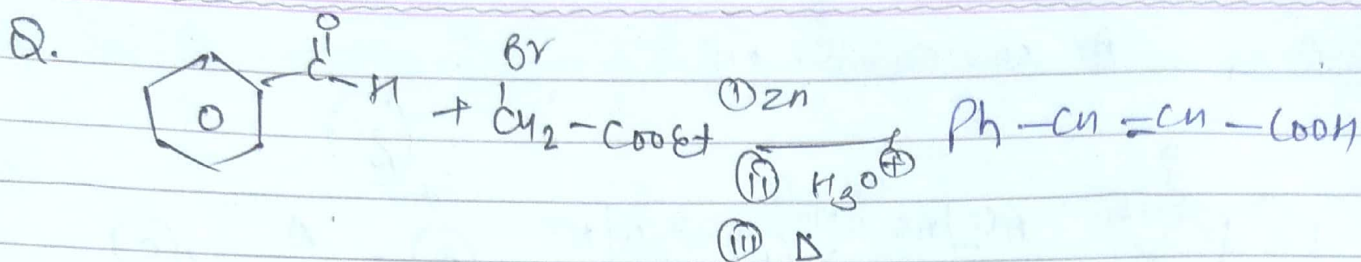
* In this Rxn also new C-C bond formed b/w α -C of Anhydride and Carbonyl-C of Aldehyde.

Reformatsky Reaction:

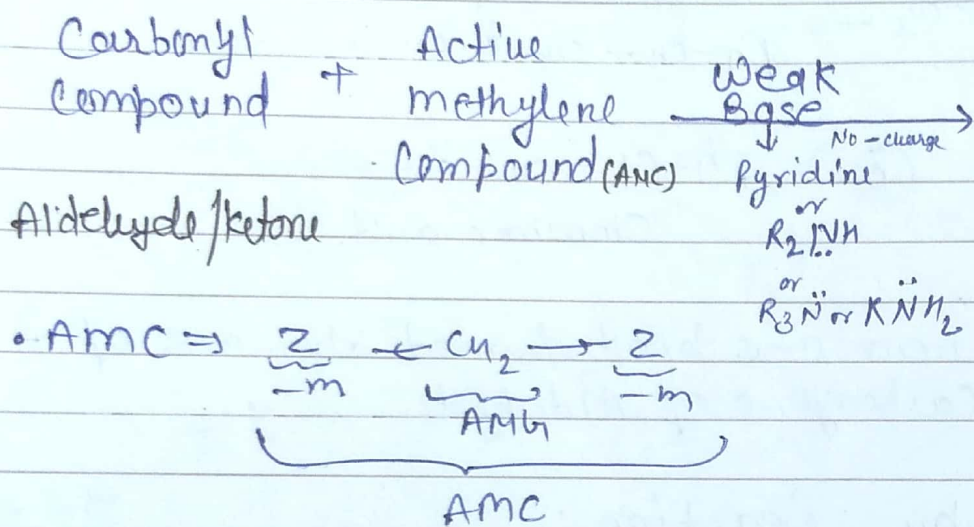


Mech^m:

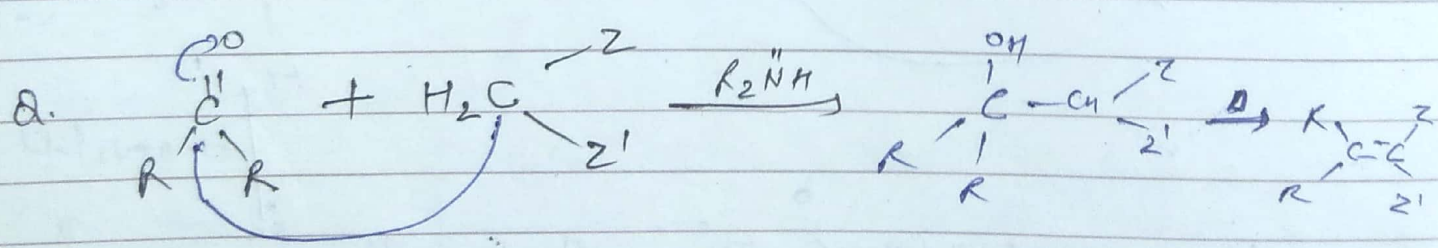
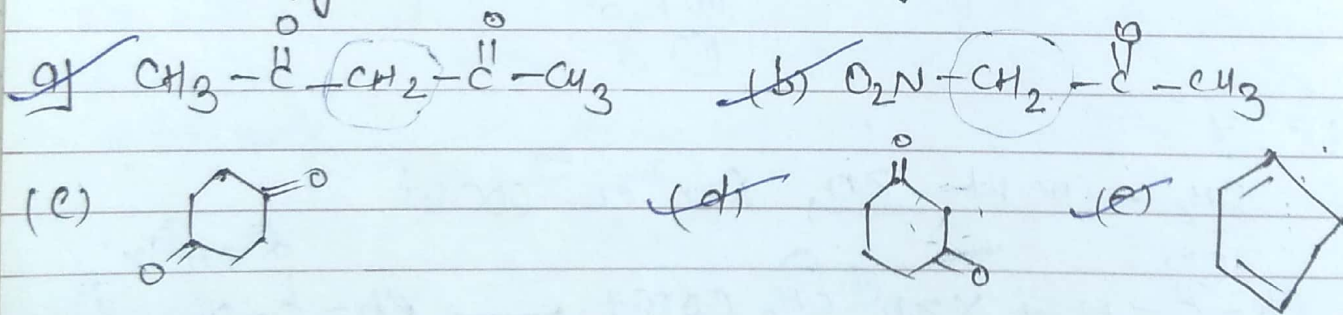


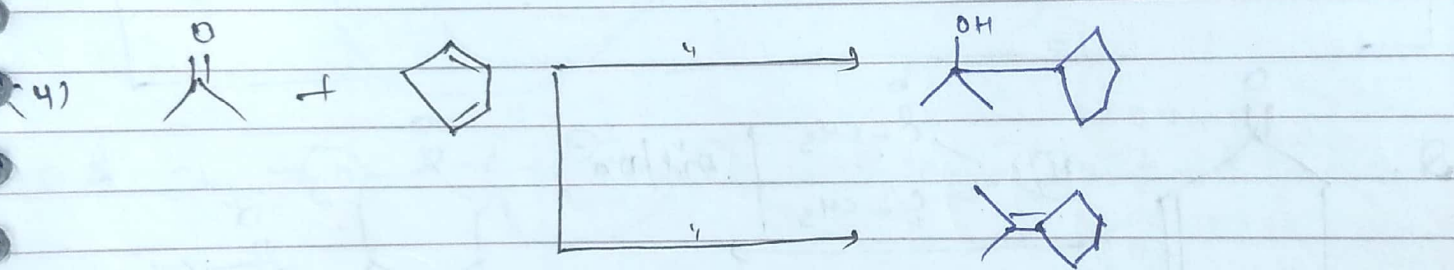
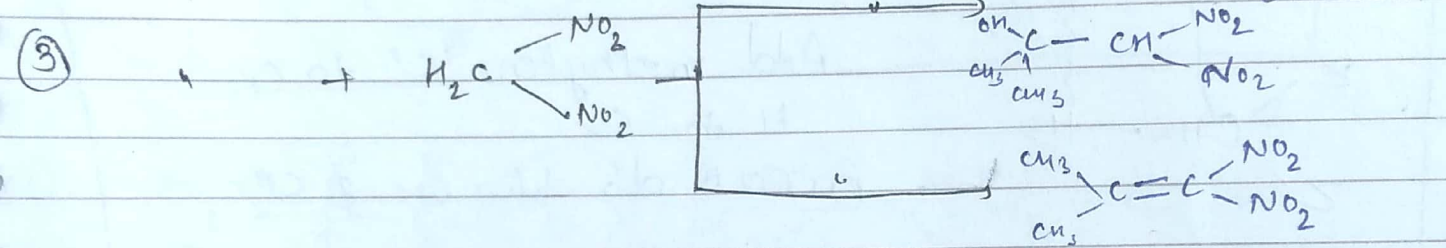
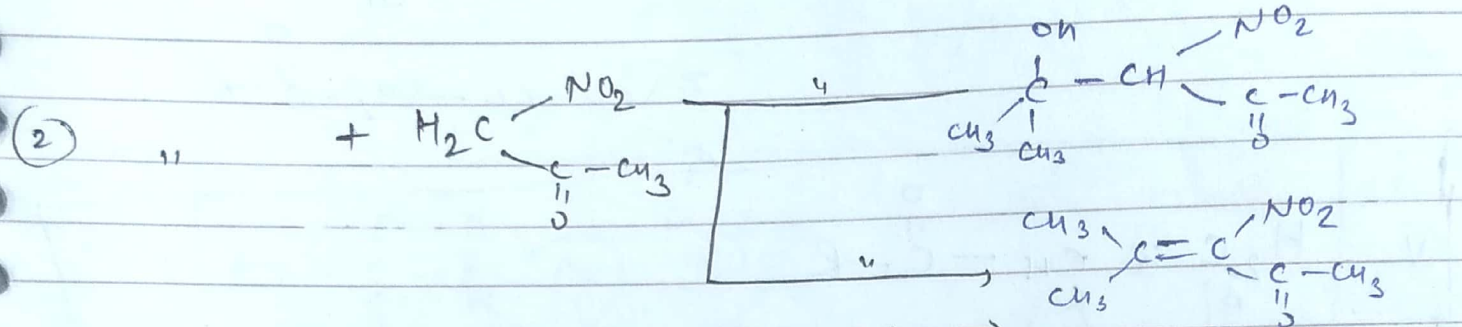
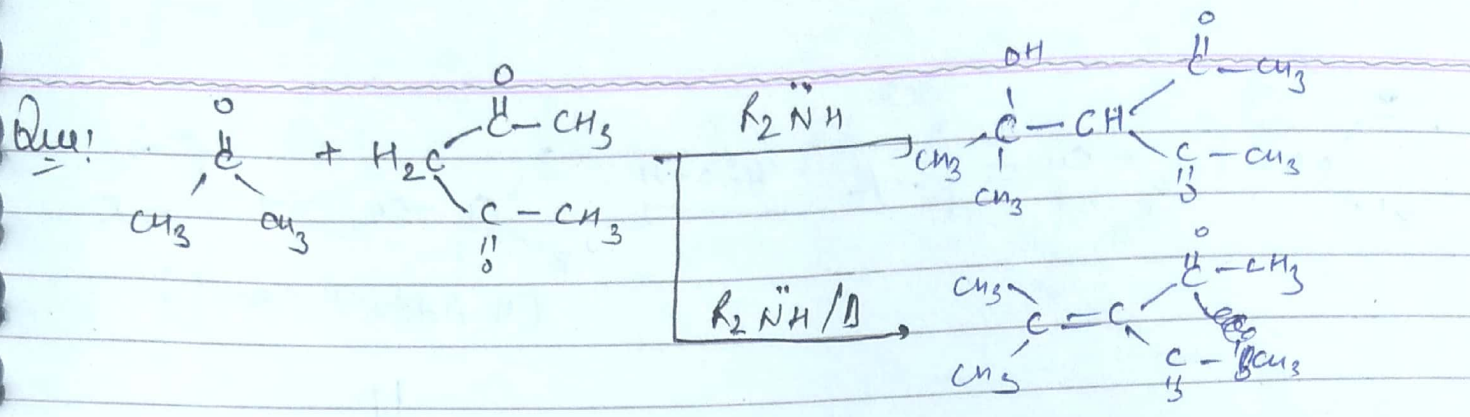


*** KNOEVENAGEL REACTIONS **



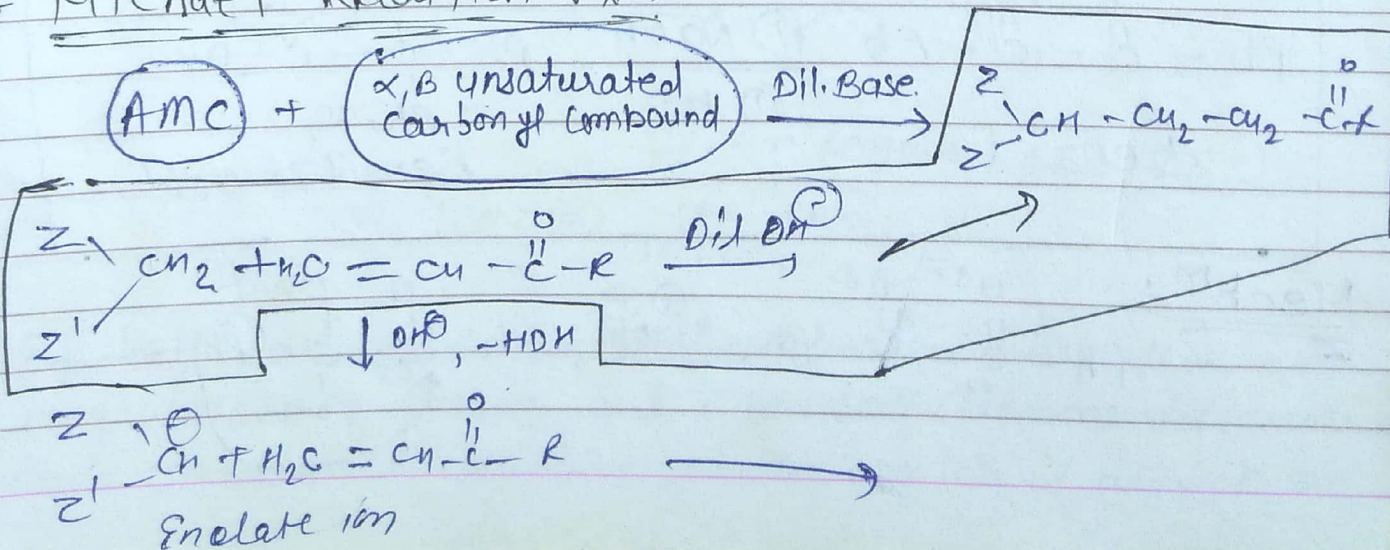
Q. Identify AMC among following.

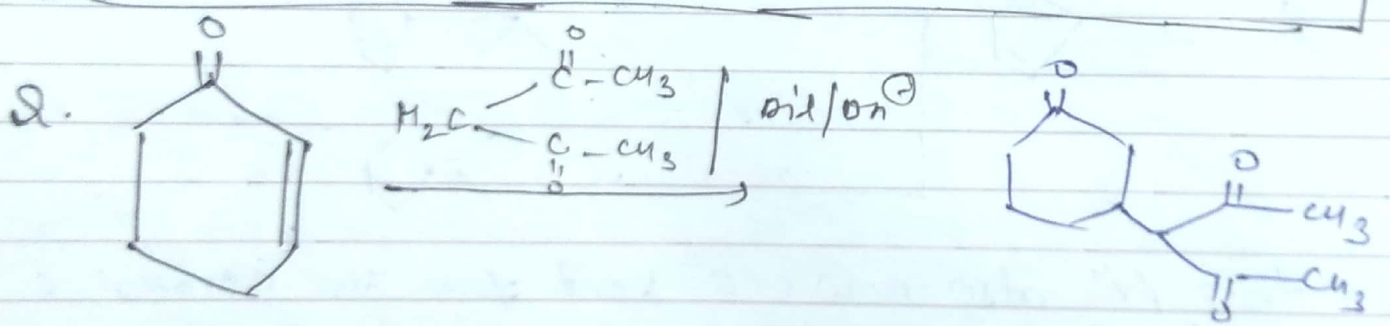
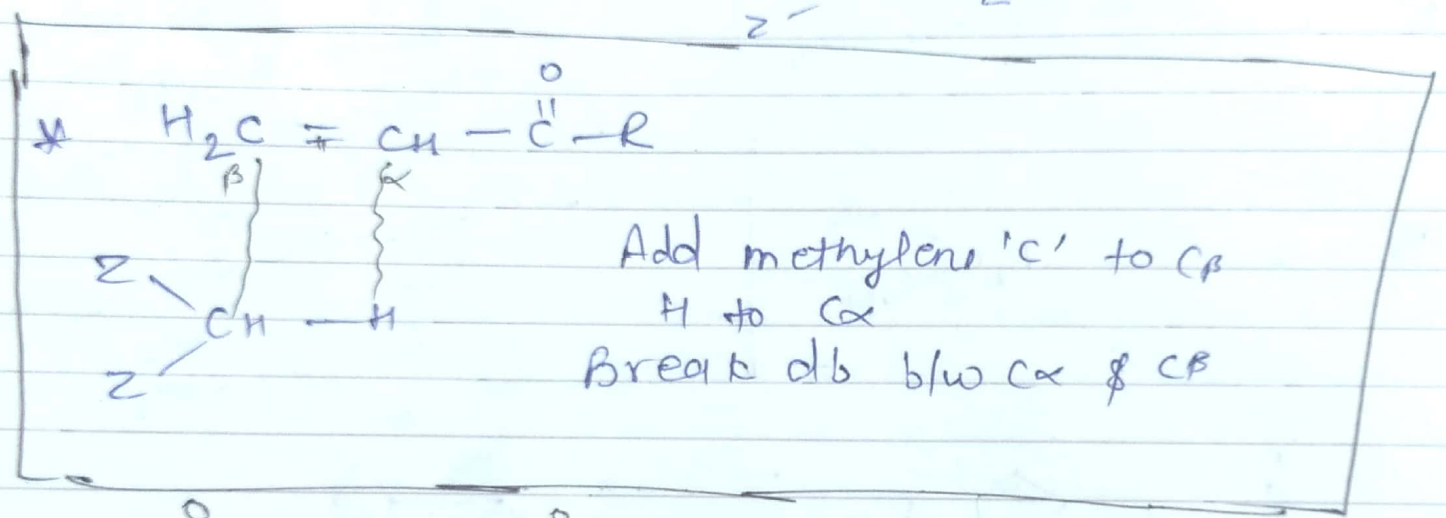
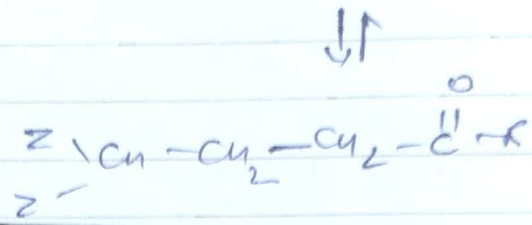
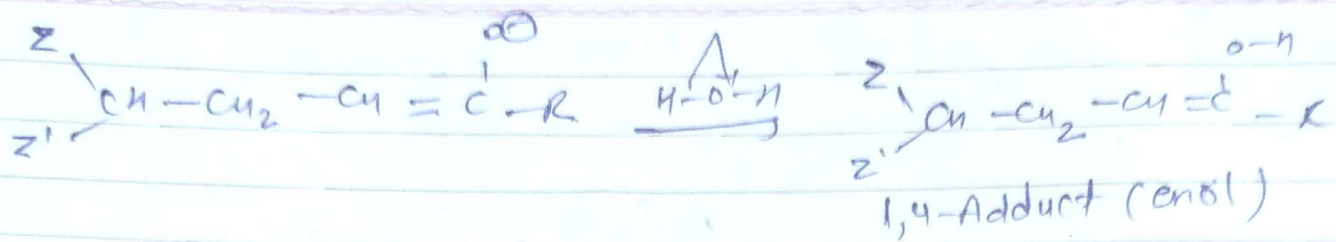




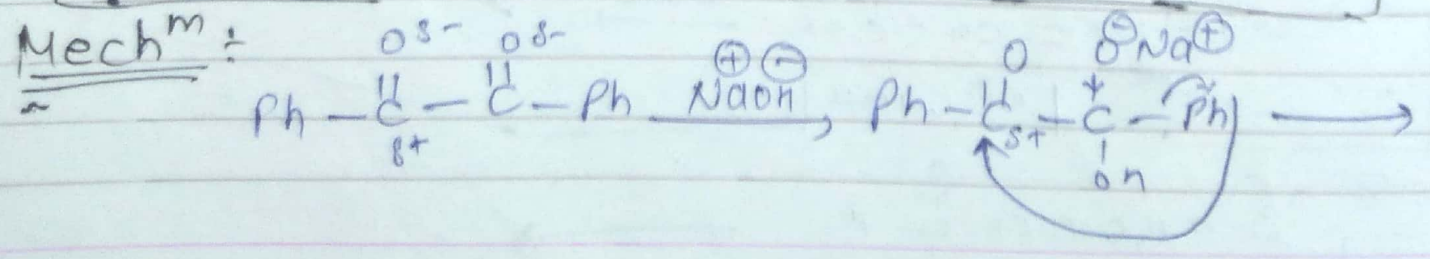
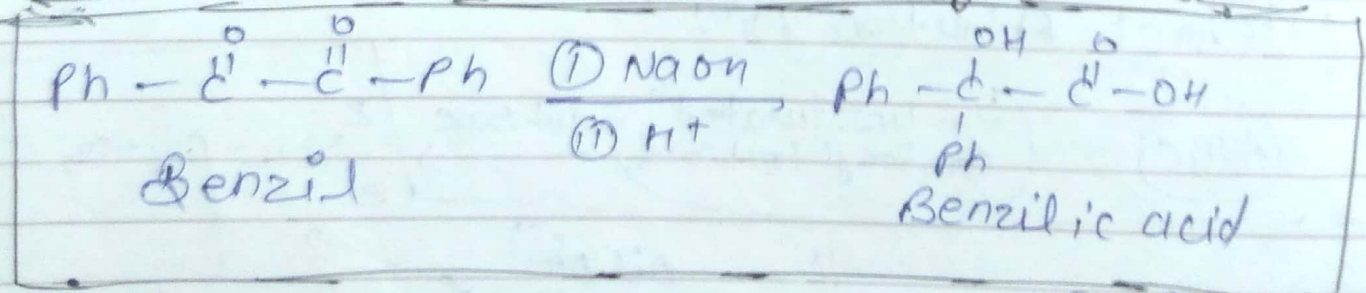
In this rxn also new C-C bond form b/w carbonyl C and Active methylene carbon.

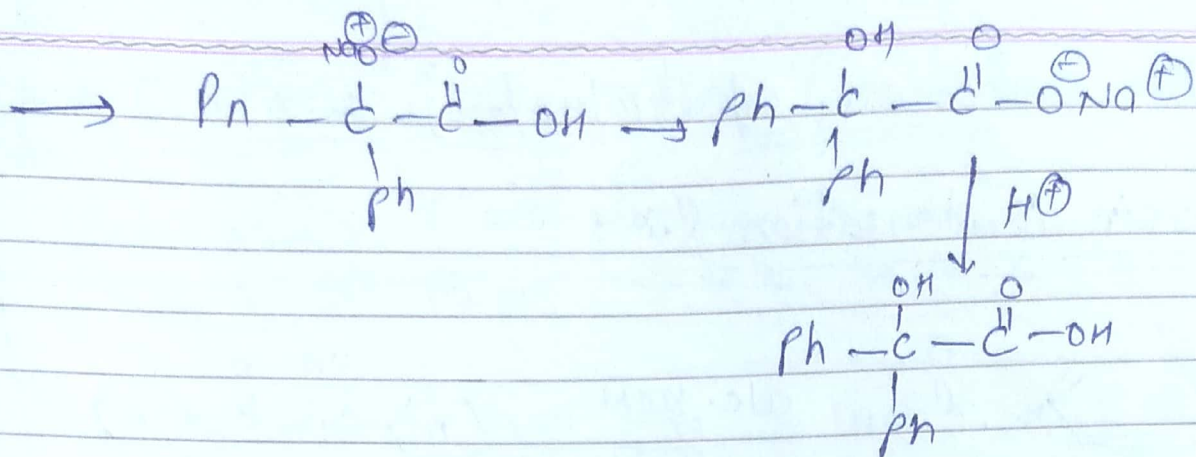
X Michael Addition Rxn 1



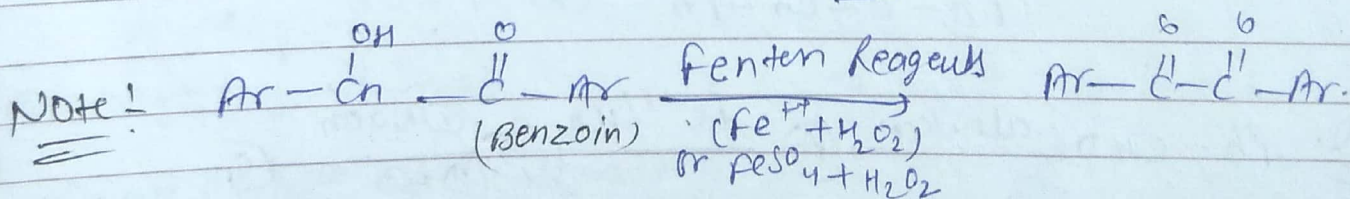
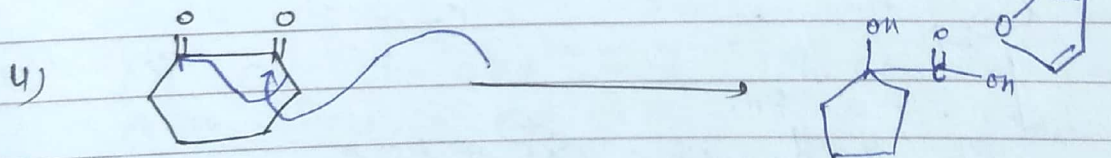
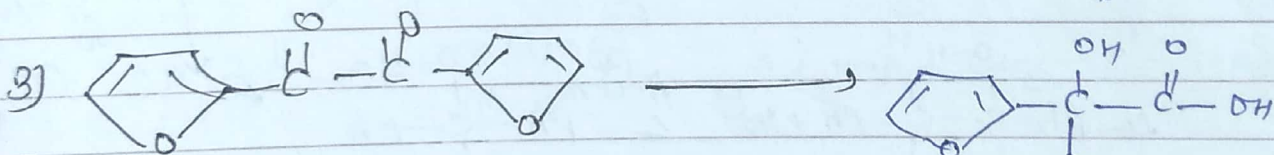
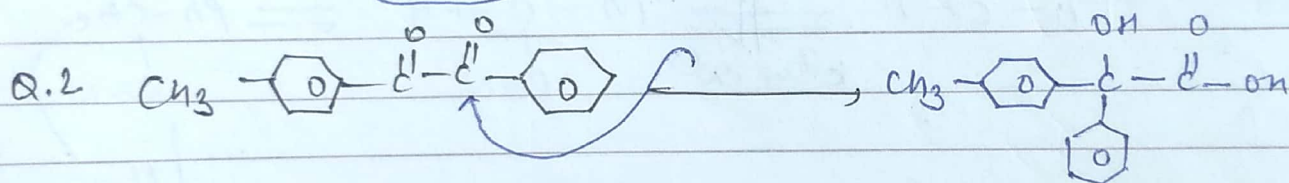
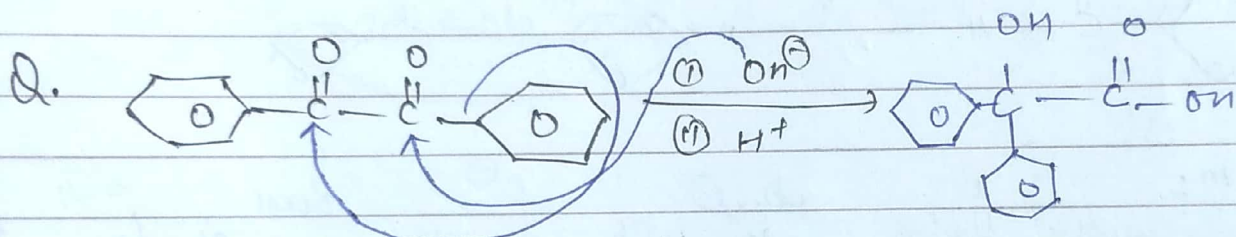
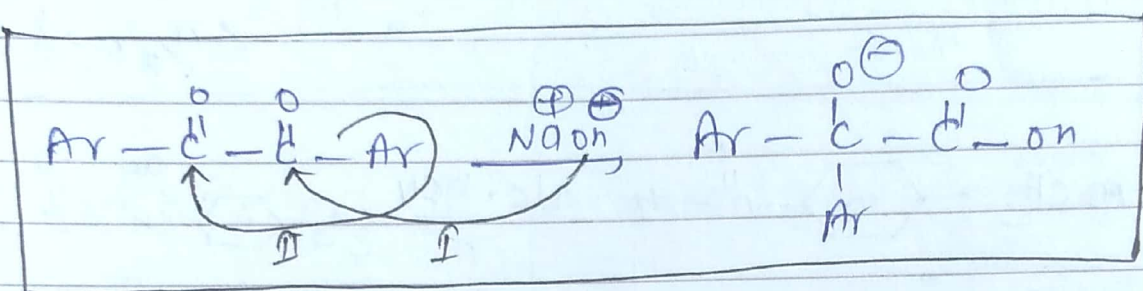


* Benzil-Benzilic acid Rearrangements:





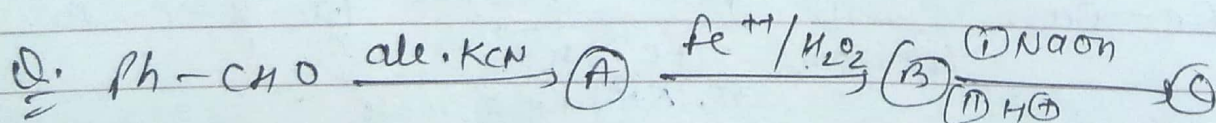
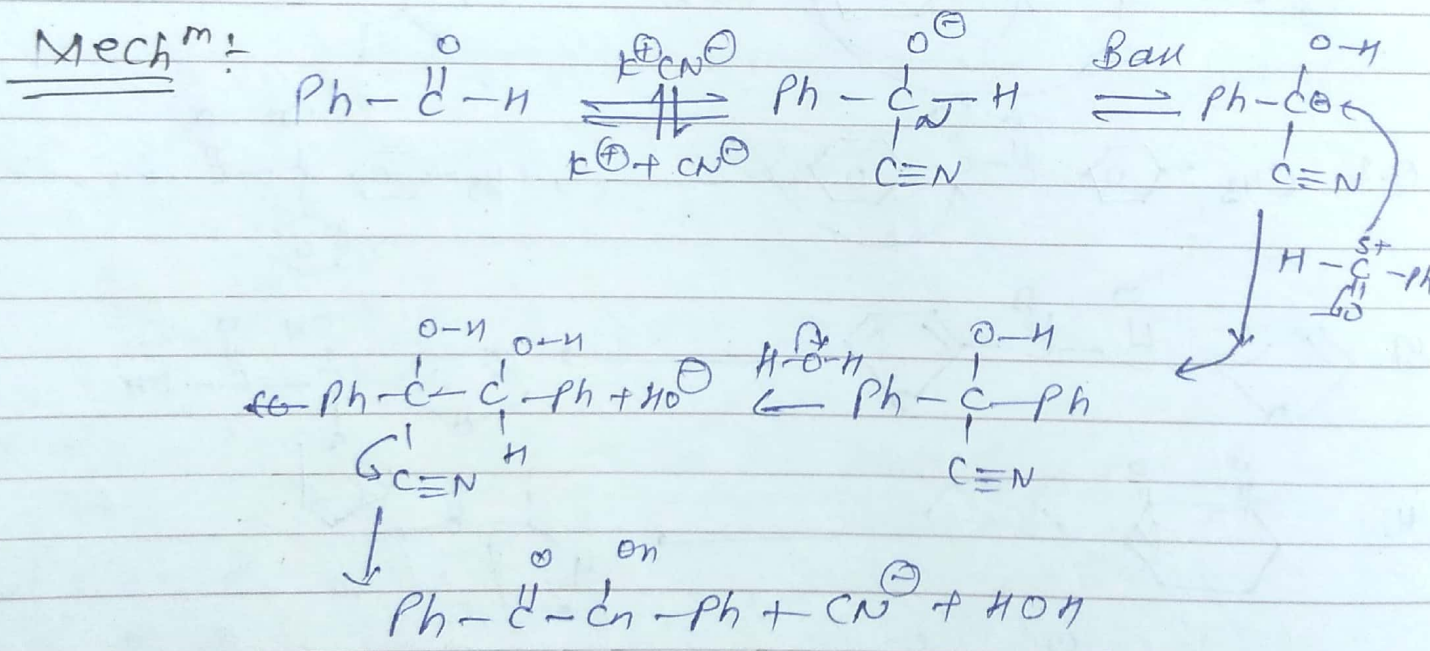
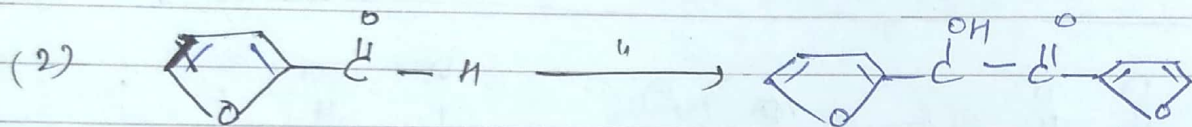
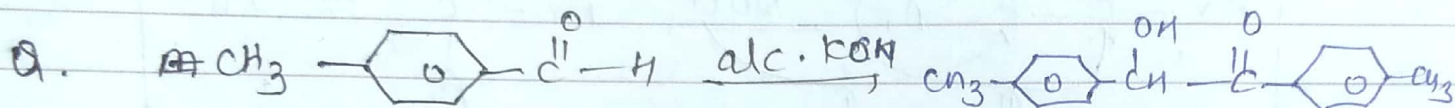
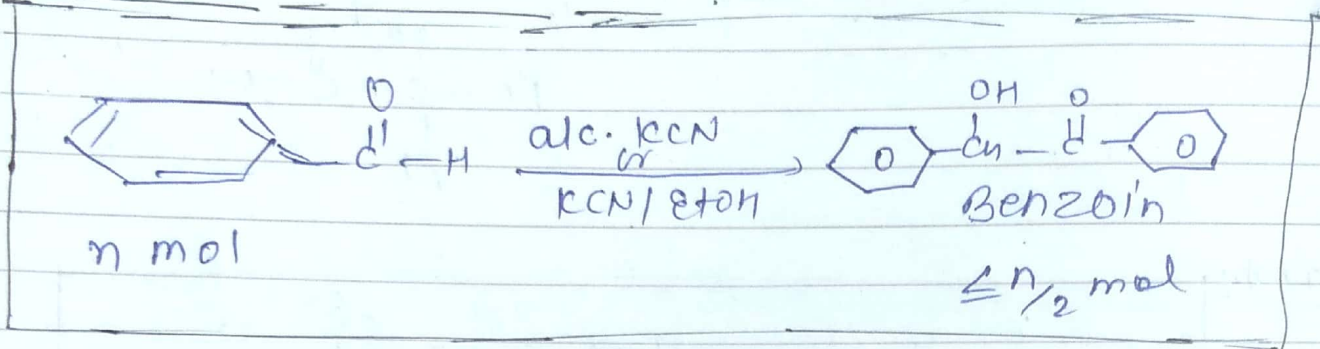
Temp:



* If both carbonyl carbon in benzyl are similar then OH^{\ominus} may attack any carbon but when both carbons are different then OH^{\ominus} attack on that carbon which is attached on

Electron withdrawing Gr (-M/+H/-I) Ex-2

* Benzoin Condensation Rxn:

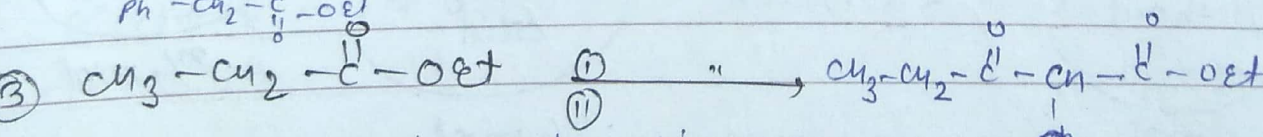
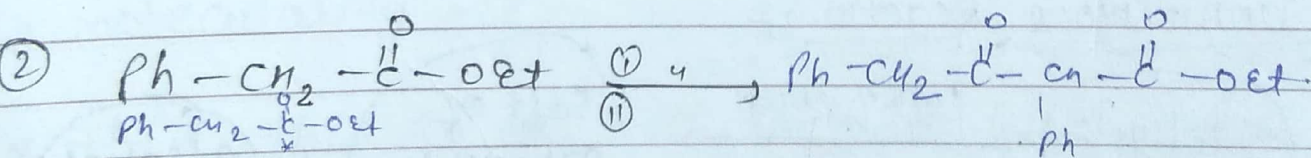
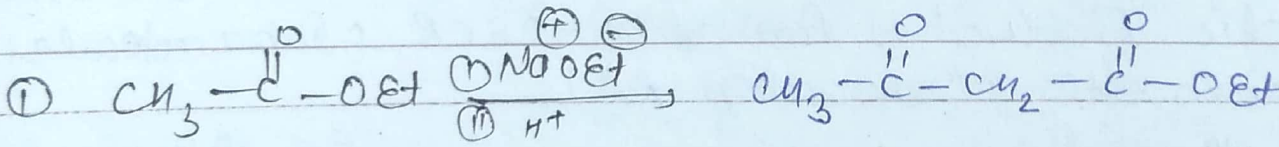
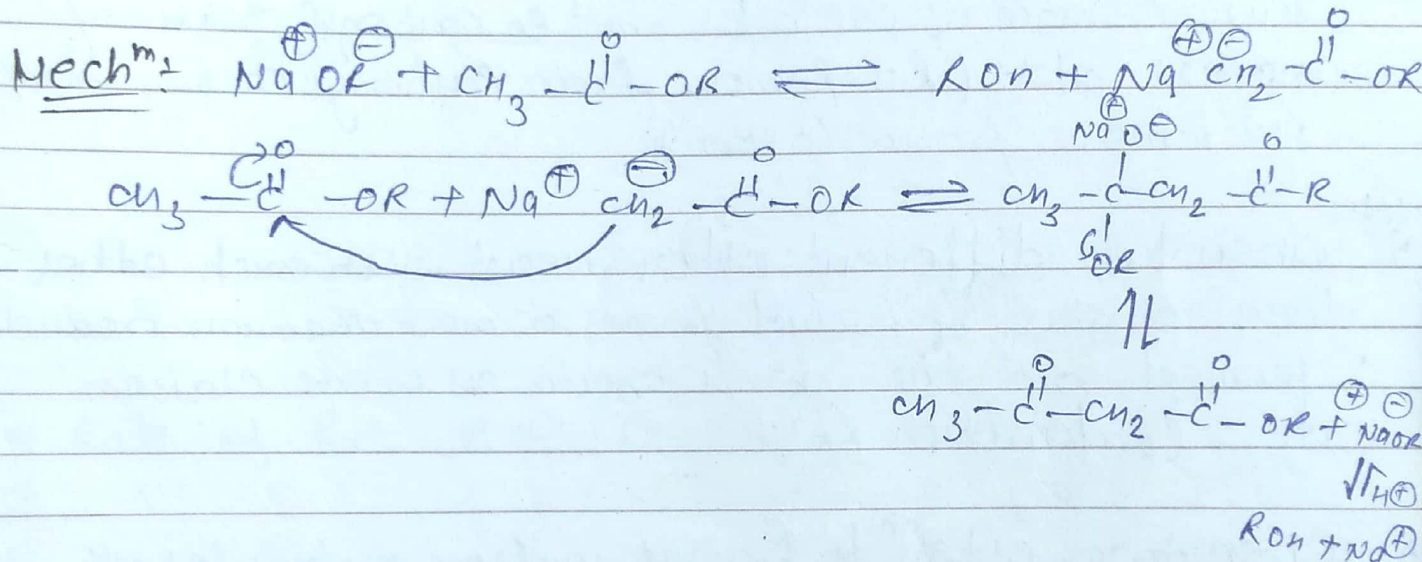
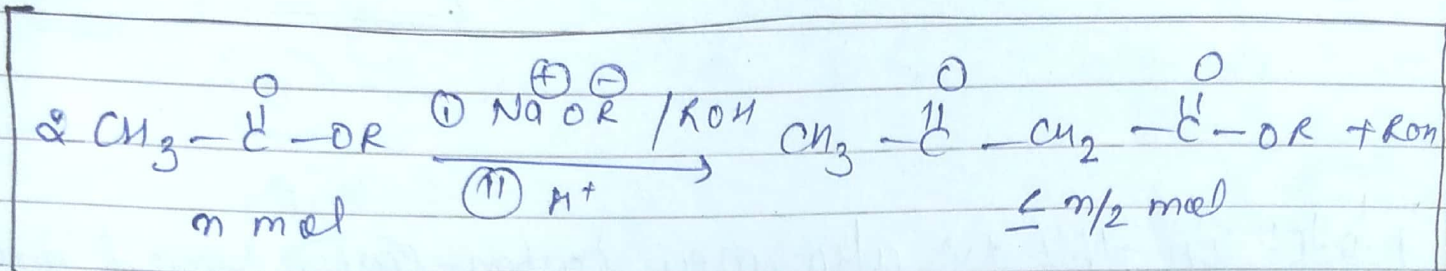
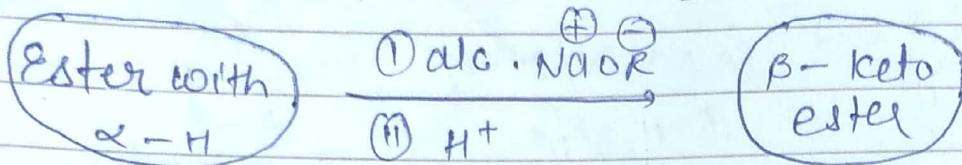


Important

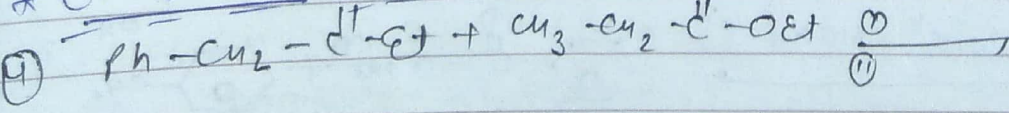
reaction, 11

★ ★ ★ ★ ★

Claisen ^{ester} Condensation: Reactions:



* Cross Claisen ester condensation Rxn:

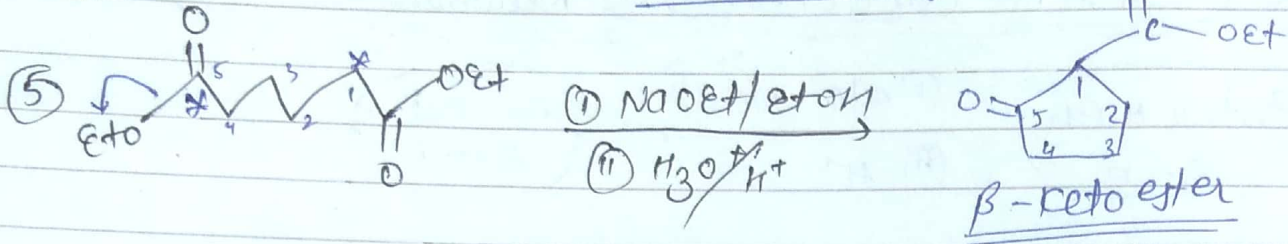


Race: 20, 19

(Date)

Ex-1 Alcohol ethyl sheet full

IMCEER or Dieckmann cyclisation

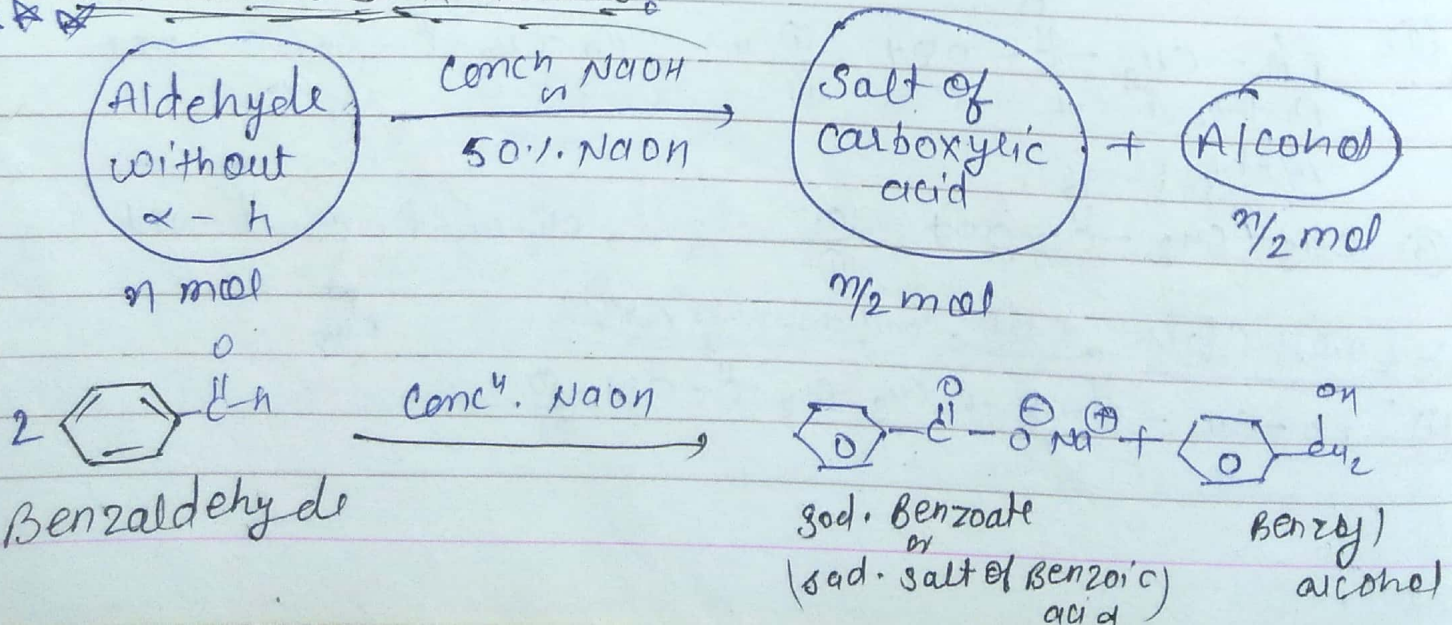


Note: In this rxn also new carbon-carbon bond formed b/w α carbon of one ester and to carbonyl carbon of another ester (to remove from carbonyl carbon and H^+ remove from α carbon)

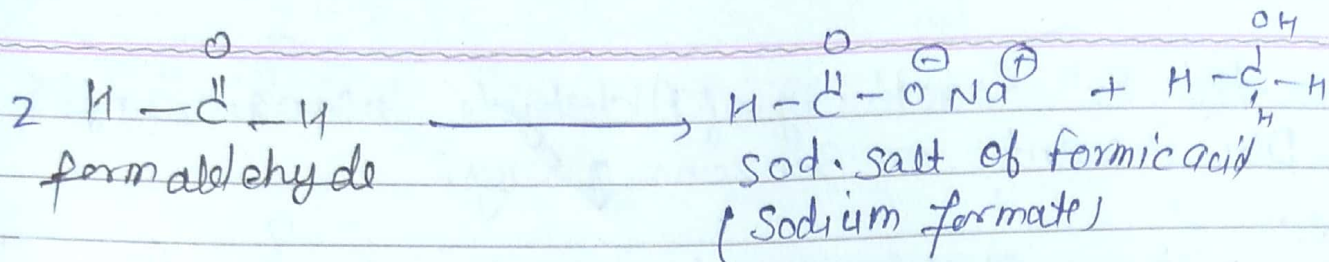
Note: * When two different ester react with each other then mixture of product formed or more than one product formed and the rxn is known as cross Claisen ester condensation rxn.

* When two ester^{gp} is present in same molecule then cyclic product is formed IMCEER. (Intramolecular Claisen ester condensation rxn).

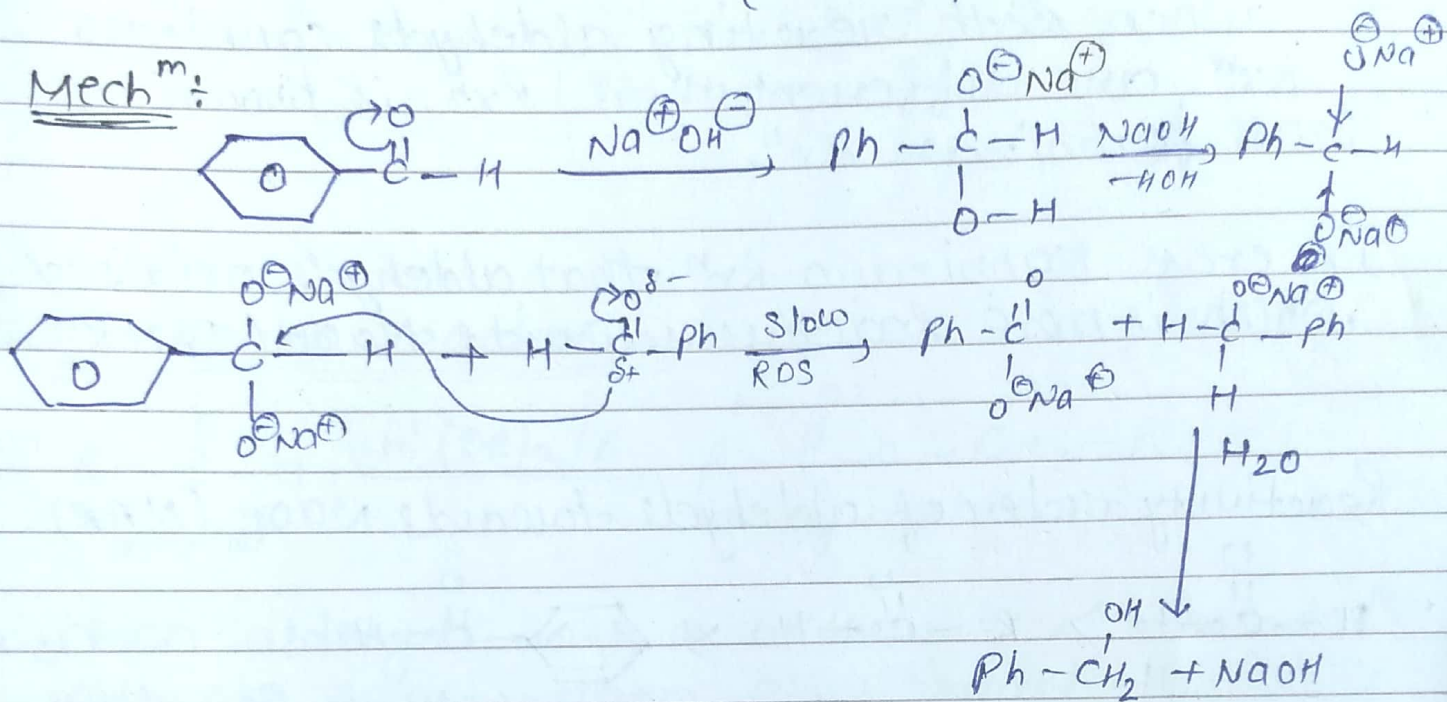
*** Cannizzaro's Reaction ***



H⁺ transfer, RDS



Mech^m:



* Rate of Rxⁿ $R \propto [\text{Ph}-\text{CHO}] [\text{Ph}-\overset{\text{O}^{\ominus}\text{Na}^{\oplus}}{\underset{\text{O}^{\ominus}\text{Na}^{\oplus}}{\text{C}}}-\text{H}]$
 $\propto [\text{Ph}-\text{CHO}]^2 [\text{NaOH}]^2$

- order = 4
- molecularity = 2

* In this Rxⁿ 50% aldehyde oxidised to salt of acid and 50% " reduces to alcohol therefore this Rxⁿ is also known as Redox Rxⁿ.

It is also known as ~~dis~~ disproportionational Rxⁿ
 It ~~is~~ RDS involve transfer of H⁺ from one aldehyde to another aldehyde.

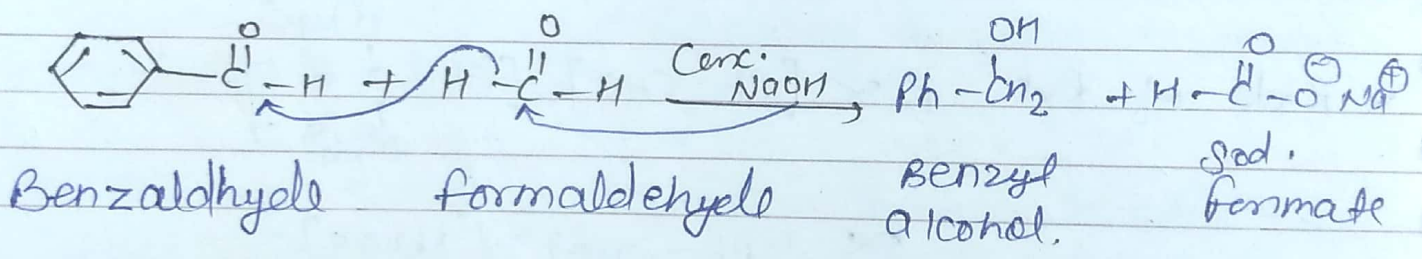
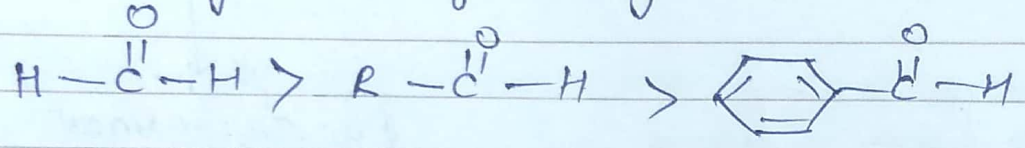
* In this Rxn Reactivity of Aldehyde increases if EDG Present on Benzene Ring.

Note!

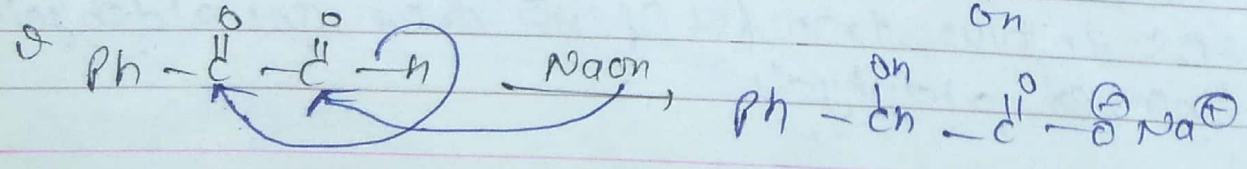
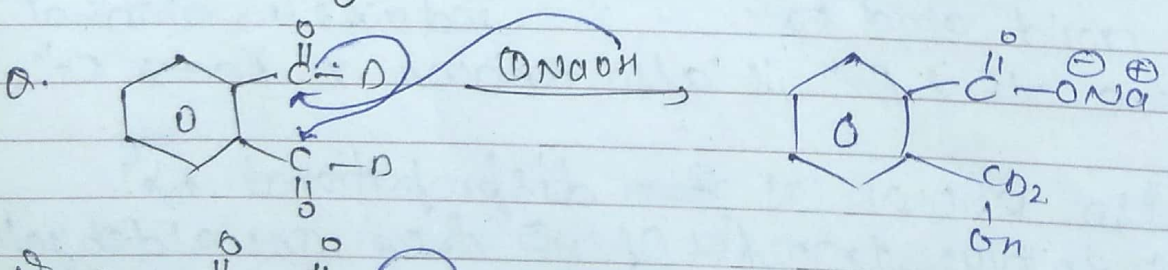
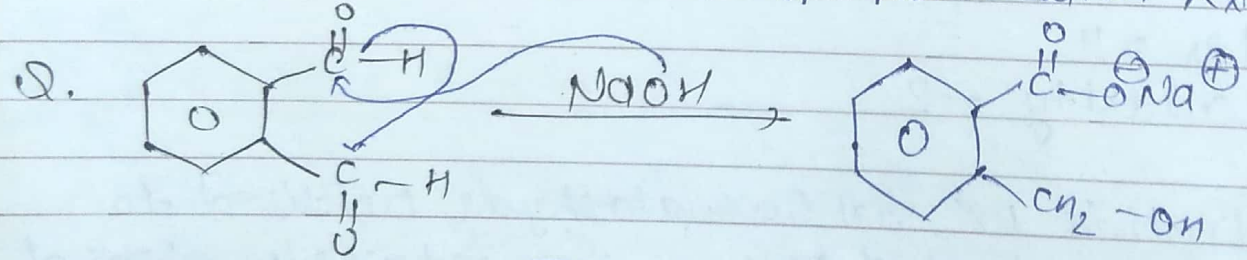
When Both reacting aldehyde cannizaro Rxn are different then Rxn is known as cross cannizaro Rxn.

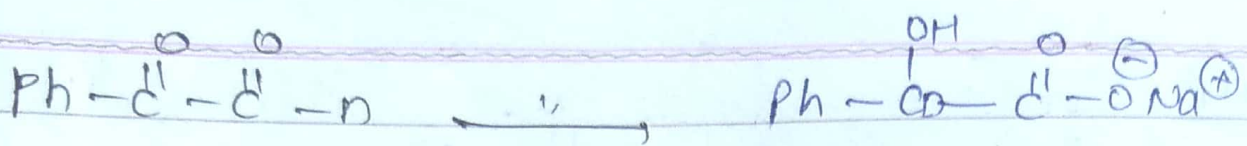
In cross cannizaro Rxn that aldehyde oxidised which is more reactive towards NaOH (NAR).

Reactivity order of aldehyde towards NaOH (NAR)

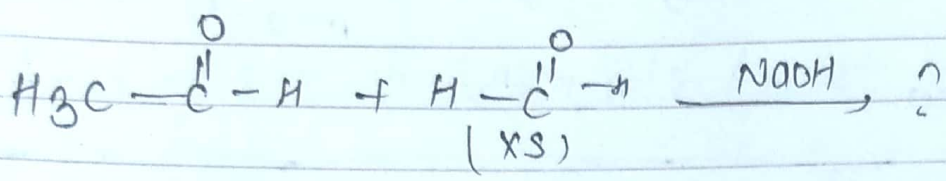


* Cross cannizaro is not a disproportionation Rxn.

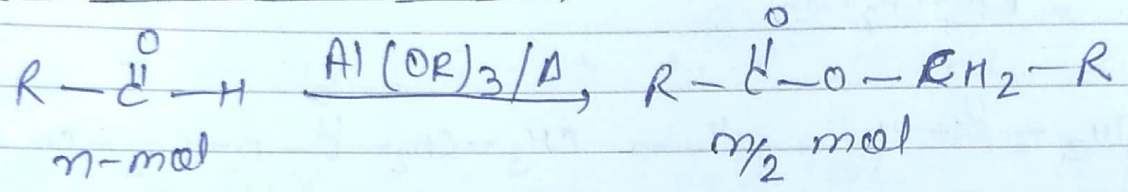




Q.1)



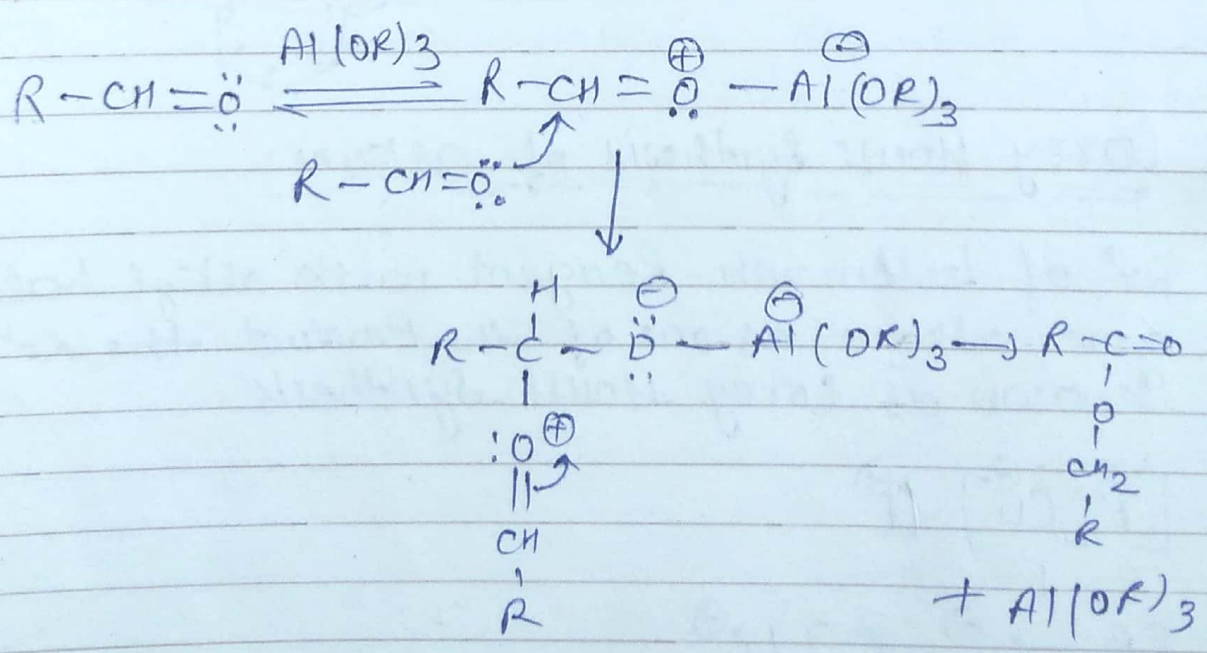
* Tischenko Reaction:

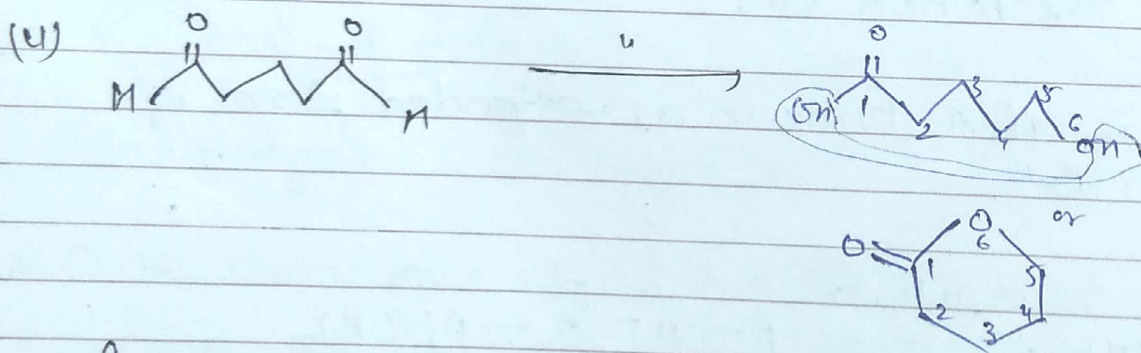
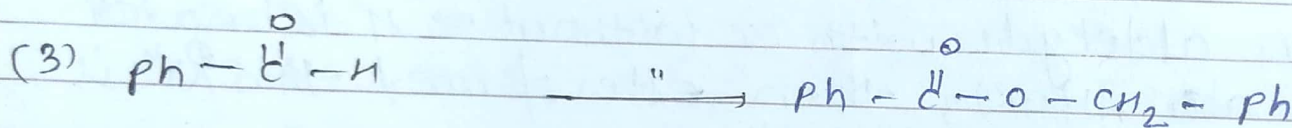
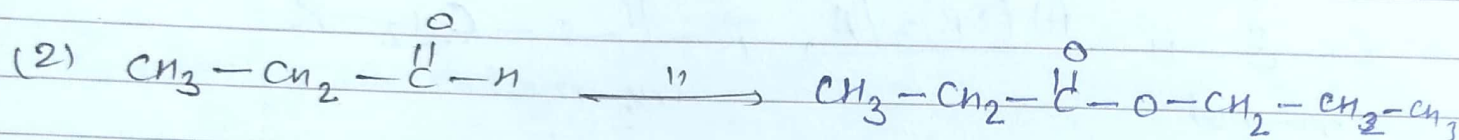
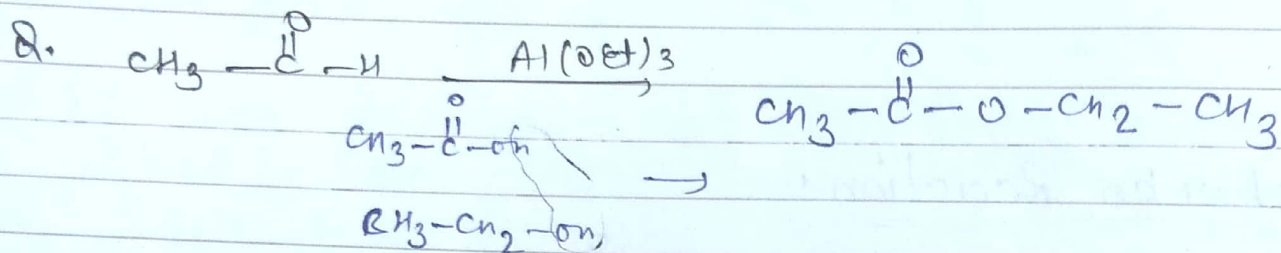
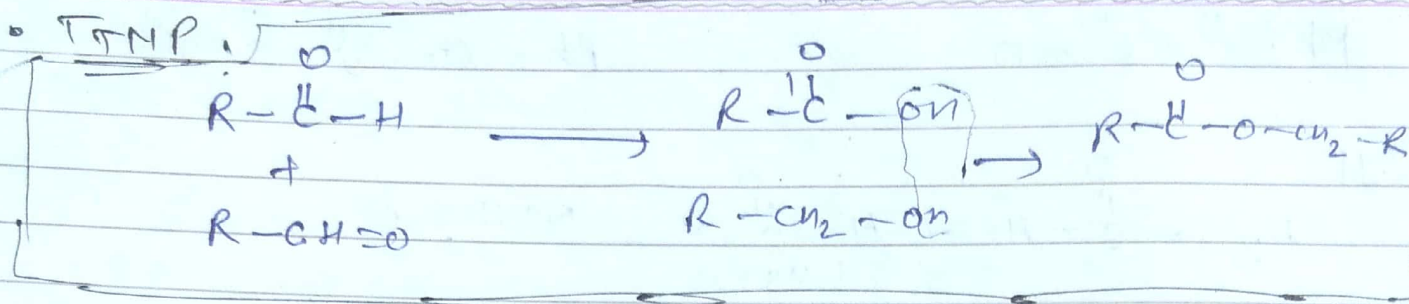


* When aldehyde with or without α H is treated with Al(OR)_3 then ester formed this Rxn is known as Tischenko Rxn.

* This Rxn is also known as extended form of Cannizzaro Rxn.

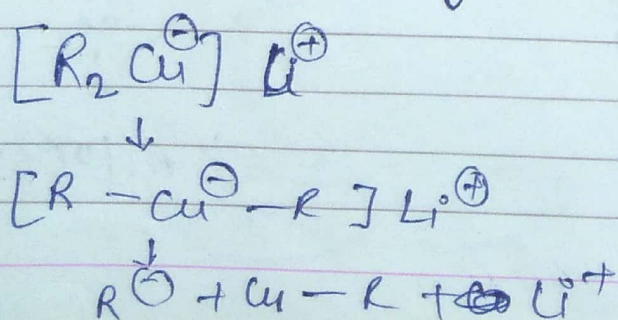
Mech ⁱⁿ





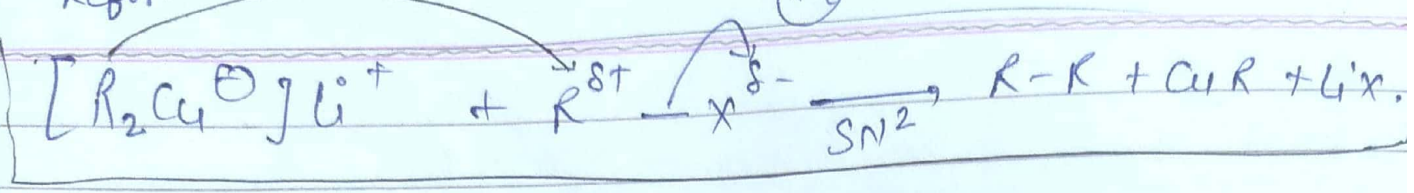
* Corey House synthesis of alkenes:

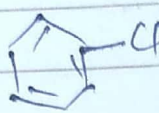
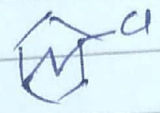
R^n of Gilman reagent with alkyl halide give alkane as one of the product the R^n is known as Corey House synthesis



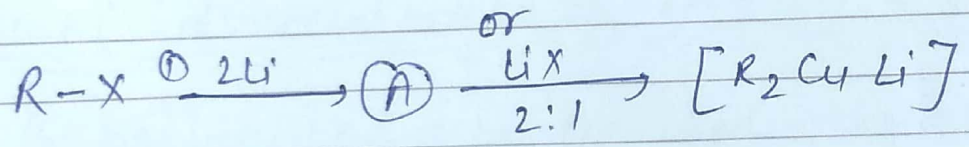
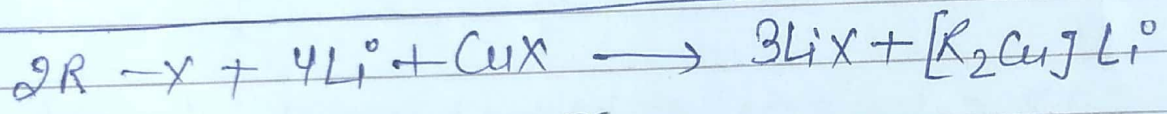
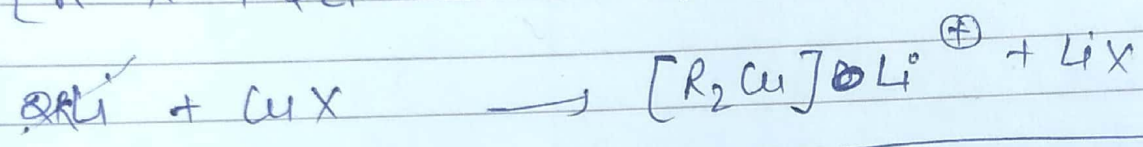
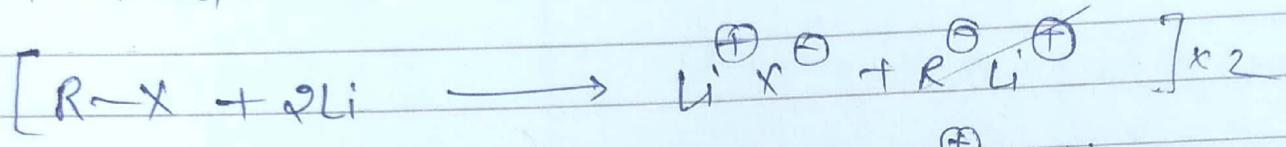
Imp: Aldol $\frac{5}{4}$ $\frac{4}{4}$ $\frac{4}{4}$ $\frac{4}{4}$ $\frac{4}{4}$ $\frac{4}{4}$
 Perkin $\frac{4}{4}$
 Knoevenagel $\frac{4}{4}$
 Reformatsky $\frac{4}{4}$
 Cannizzaro $\frac{4}{4}$ $\frac{4}{4}$ $\frac{4}{4}$ $\frac{4}{4}$ $\frac{4}{4}$
 Claisen condensation $\frac{4}{4}$
 Haloborn $\frac{4}{4}$

3. $\text{Ni}^0 - \text{SN}^2$



- $\text{R-X} = 1^\circ$ or 2° Halide (Best me-cl)
- $\text{R-X} \neq 3^\circ \text{R-X}$, , . $\text{H}_2\text{C}=\text{CH}-\text{Cl}$

* Gilman reagent can be prepared by following Method



* Reactions of Carboxylic acids:

(1)

SBG STUDY