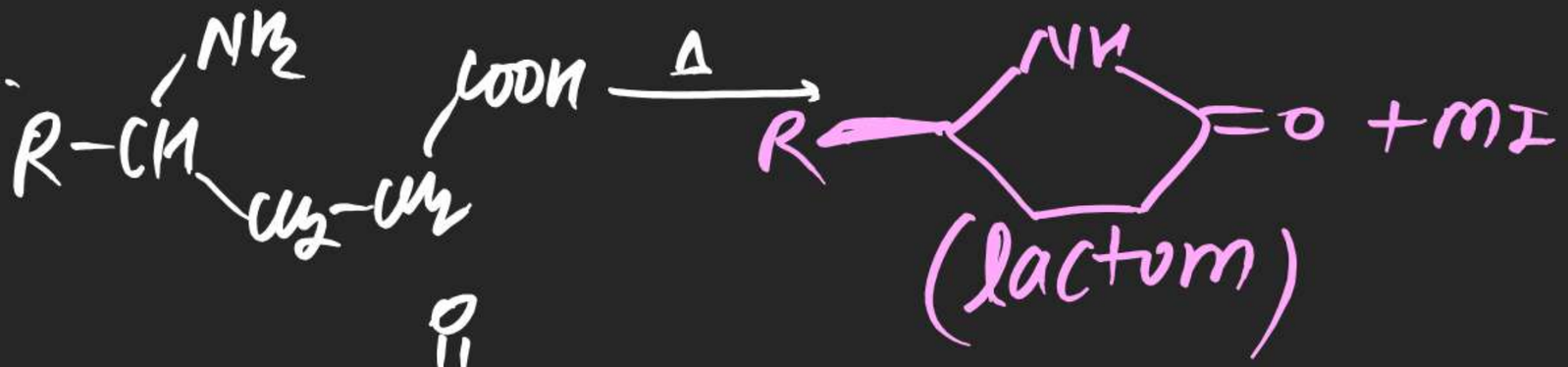
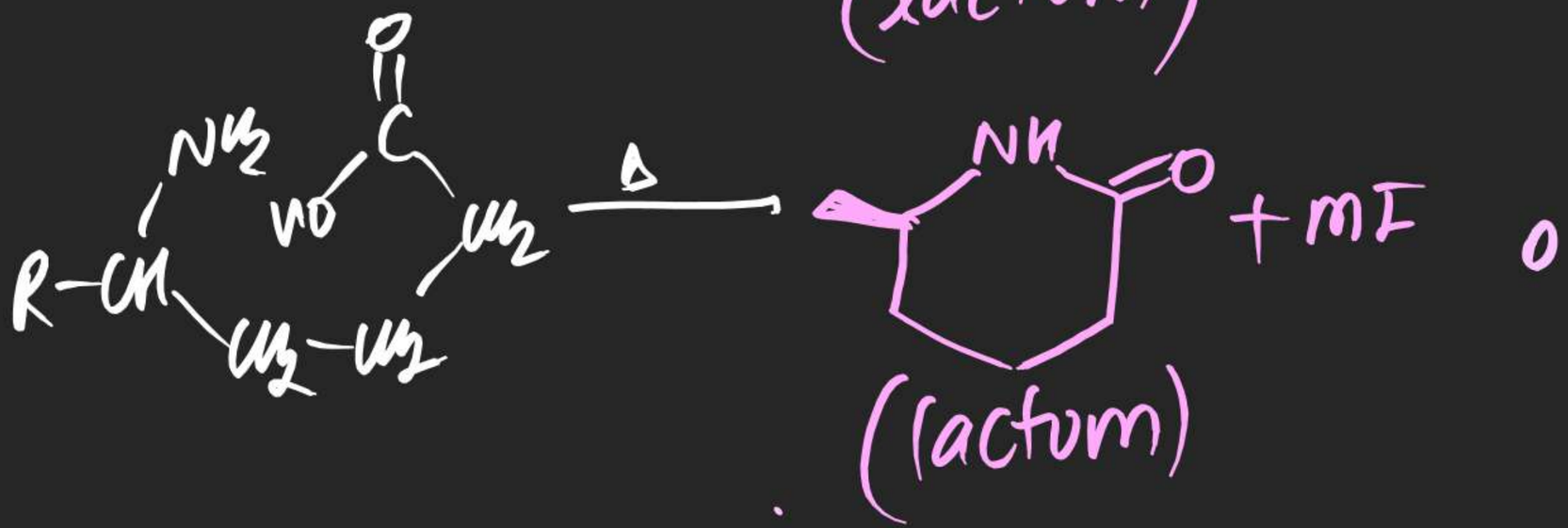
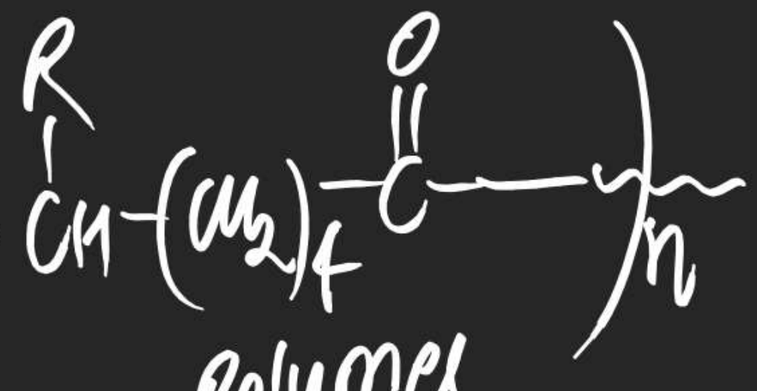
(3) γ-Amino Acid:-



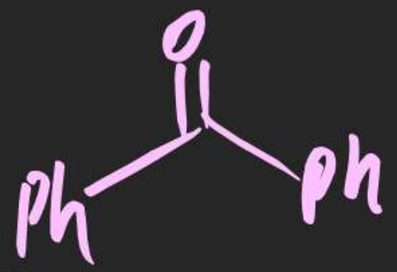
(4) δ-Amino Acid:



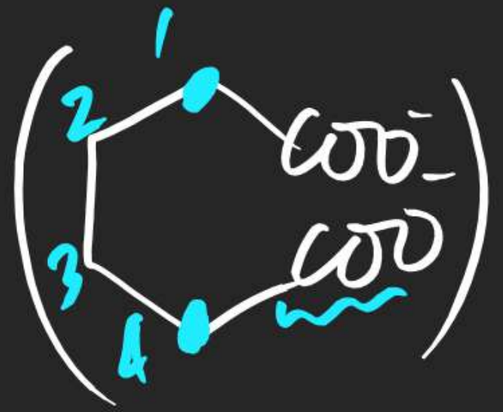
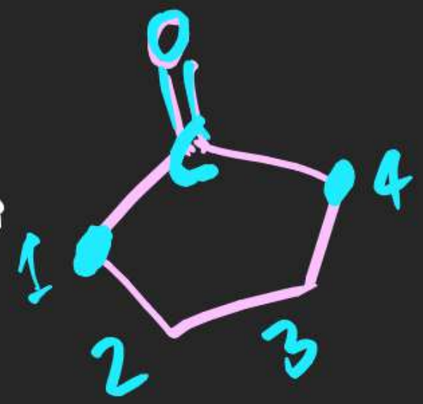
(5) ω-Amino Acid:

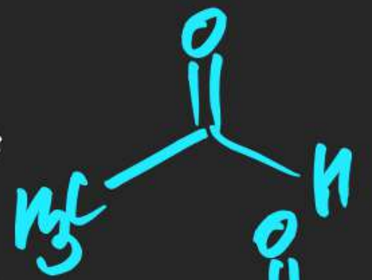
"n" $H_2N-\underset{R}{CH}-(CH_2)_4-\overset{O}{\overset{\|}{C}}-OH \xrightarrow{\Delta}$ 

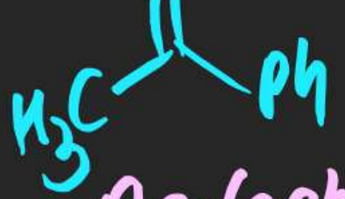
(3) $(CH_3-COO)_2Ca \xrightarrow{\Delta}$ 

(4) $(Ph-COO)_2Ca \xrightarrow{\Delta}$ 

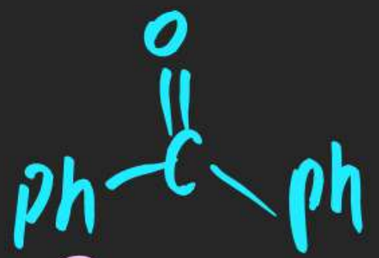
(5)  $\xrightarrow{\Delta}$ 

(6)  $Ca^{+2} \xrightarrow{\Delta}$ 

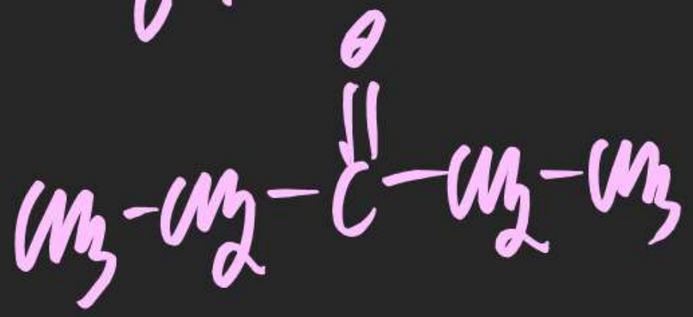
(7) $(CH_3-COO)_2Ca + (H-COO)_2Ca \xrightarrow{\Delta}$ 

(8) $(CH_3-COO)_2Ca + (Ph-COO)_2Ca \xrightarrow{\Delta}$ 

Acetophenone

(9) $Ph-COOH \xrightarrow[\Delta]{MnO}$ 

Benzophenone

(10) $\boxed{CH_3-CH_2}-COOH \xrightarrow[\Delta]{BaO}$ 

Nishant Jindal

(#) Soda lime decarboxylation (Oakwood degradation) :-

⇒ whenever Sodium salt of Carboxylic Acid is treated with Soda lime, it gets decarboxylated & Hydrocarbon is obtained as a Product.

(1) $R-C(=O)-ONa + NaOH \xrightarrow{CaO} R-H + Na_2CO_3$

Mechⁿ:

$R-C(=O)-O^{\ominus}\,Na^{\oplus} \xrightarrow{r.d.s} R^{\ominus}\,Na^{\oplus} + CO_2$

$2NaOH + CO_2 \longrightarrow Na_2CO_3 + H_2O$

$$CaO + CO_2 \longrightarrow CaCO_3$$

$$R^{\ominus}\overset{\oplus}{Na} + H_2O \longrightarrow R\text{-}H + NaOH$$

Note (i) Carbanion intermidiate

(ii) Formation of Carbanion is r.d.s

(iii) degradation Reaction

(iv) order of rate of decarboxylation $\propto$ Stability of Carbanion

(v) This method is laboratory method for preparation of Hydrocarbon alkane.

(2) $CH_3-COONa + NaOH \xrightarrow{CaO}$

Sodium Acetate

(3) $CH_3-CH_2-COONa + NaOH \xrightarrow{CaO}$

(4)  $\xrightarrow{CaO}$

(5)  $\xrightarrow{CaO}$

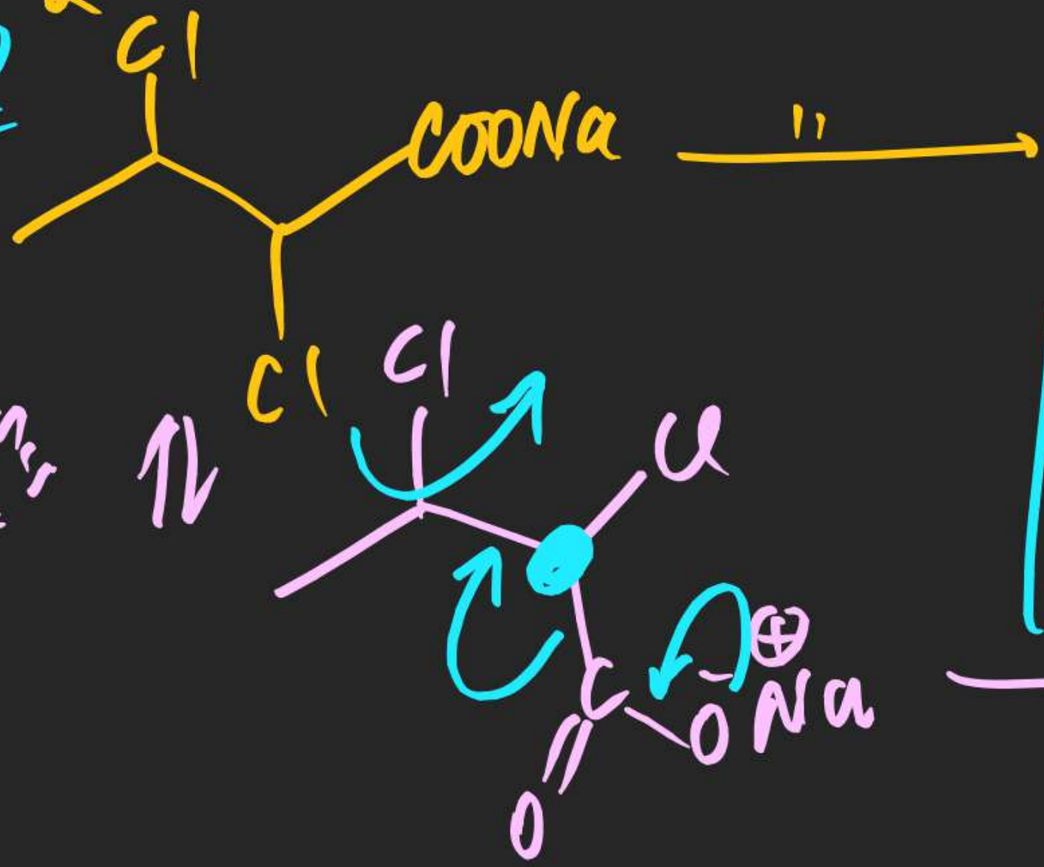
(6) $CH_3-CH_2-COONa \xrightarrow[CaO]{NaOD}$

(7) $CH_2=CH-CH_2-COONa \xrightarrow[CaO]{NaOH}$

(8) $CH_2=CH-\overset{14}{C}H_2-COONa \xrightarrow{\Delta}$

M.Eup

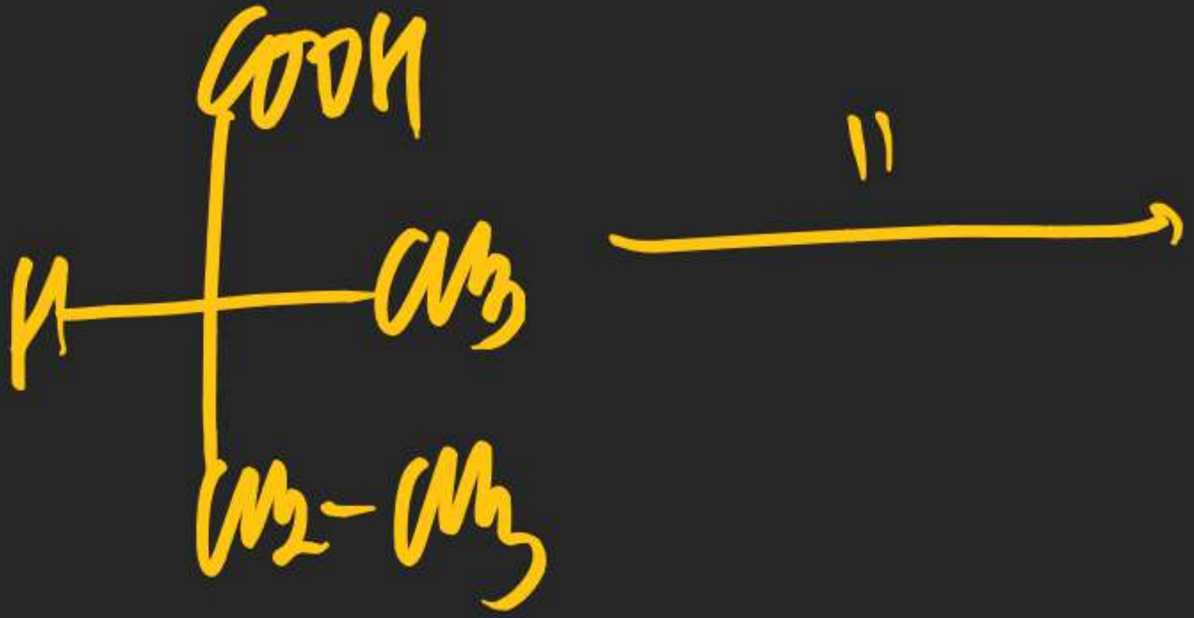
(9)



(10)

(11)

(12)



Nishant Jindal

Reduction Reaction

⇒ Acceptance of $\bar{e}$s

⇒ electon acceptor

⇒ Reactions in which Organic Reactant accept $\bar{e}$s (gets Reduced) are known as Reduction Reaction.

Reducing agent

R-MgX	$LiAlH_4$	Na	H_2
R_2CuLi	$NaBH_4$	Zn	N_2H_4/H_2O_2
RLi	$(iBu)_2AlH$	Sn	Red P/HI
R_2Cd	DIBAL	Mg	
	B_2H_6		

Reduction By Organometallic Bond

Organometallic Compound : Compounds having Carbon & metal Covalent Bond are known as Organometallic Compound.

* $\overset{\delta-}{C}$ — $\overset{\delta+}{metal}$

Reactivity of Organometallic Compound $\propto \Delta E_n$ b/w Carbon & metal

(*) Reactivity order

C (2.5) > Na (0.9) > Li (1) > Mg (1.3) > ..... > Cd (1.7) > Cu (1.9) > ....

Nishant Jindal

Reactivity order:-

$$\underbrace{RNa > RLi > R_2Mg}_{\text{Hard Nu}} > - - - > \underbrace{R_2Cu}_{\text{Soft Nu}}$$

Grignard Reagent

⇒ Alkyl/Aryl Magnesium Halide

⇒ R–MgX

Ex: $H_3C^{\delta-}-Mg^{\delta+}X$,  $-Mg^{\delta'-}Br^{\delta'+}$, $H_2C=CH-Mg^{\delta''-}I^{\delta''+}$

⇒ G.R is not a Carbanion, it's source of Carbanion

Nishant Jindal

Method of Preparation :-

⇒ Whenever Alkyl Halide is treated with Magnesium metal in Dry Ether in 1:1 ratio, G.R is obtained as a Product.

(1) $R-X + Mg \xrightarrow{\text{Dry Ether}} \overset{\delta-}{R}-\overset{\delta+}{Mg}X$

Mechⁿ (Free Radical Mechⁿ)

$\dot{Mg} + R-X \longrightarrow R^{\bullet} + \dot{Mg}X$

$R^{\bullet} + \dot{Mg}X \longrightarrow R-MgX$

Ionic Mechⁿ :-

$\dot{Mg} + R-X \longrightarrow R^{\ominus} + \overset{\oplus}{Mg}X$

$R^{\ominus} + \overset{\oplus}{Mg}X \longrightarrow R-MgX$

Note (i) Carbon free Radical & Carbanion are intermidite

(ii) Breaking of $>C-X$ Bond is R.D.S

(iii) order of rate of formation of G.R

$$R-I > R-Br > R-Cl > R-F$$

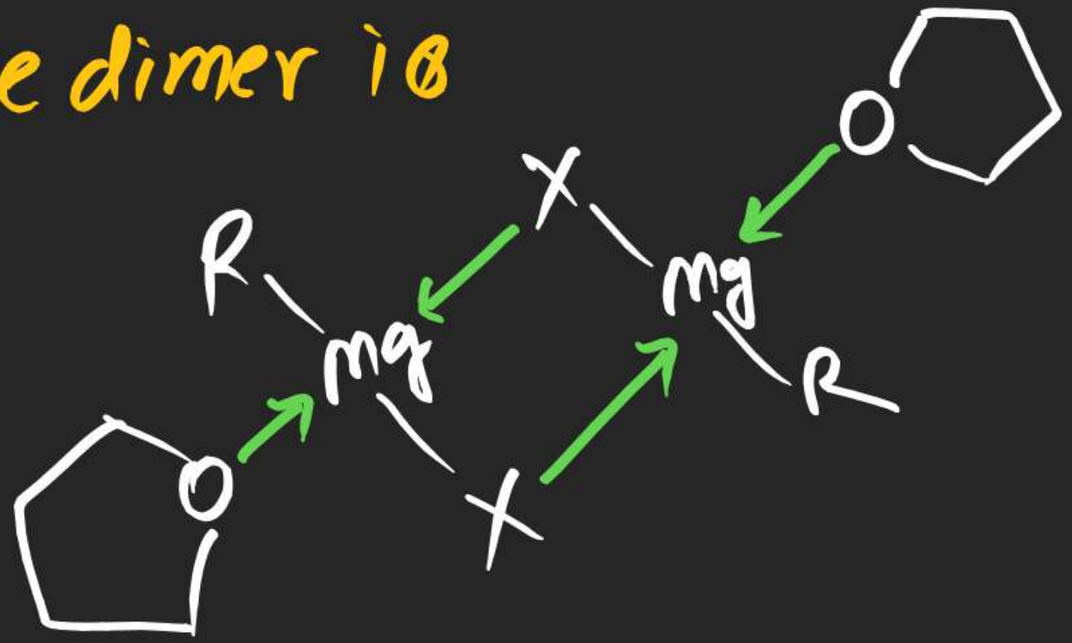
(iv) G.R is soluble in Ether & Tertiary Amine hence Both are used as a Solvent during G.R Reactions.

(v) G.R Exist as a Dimer in soln

$$2RMgX \rightleftharpoons Dimer \rightleftharpoons R_2Mg + MgX_2$$

Nishant Jindal

(vi) Probable dimer is



(2) $CH_3-Cl + Mg \xrightarrow{Et_2O}$

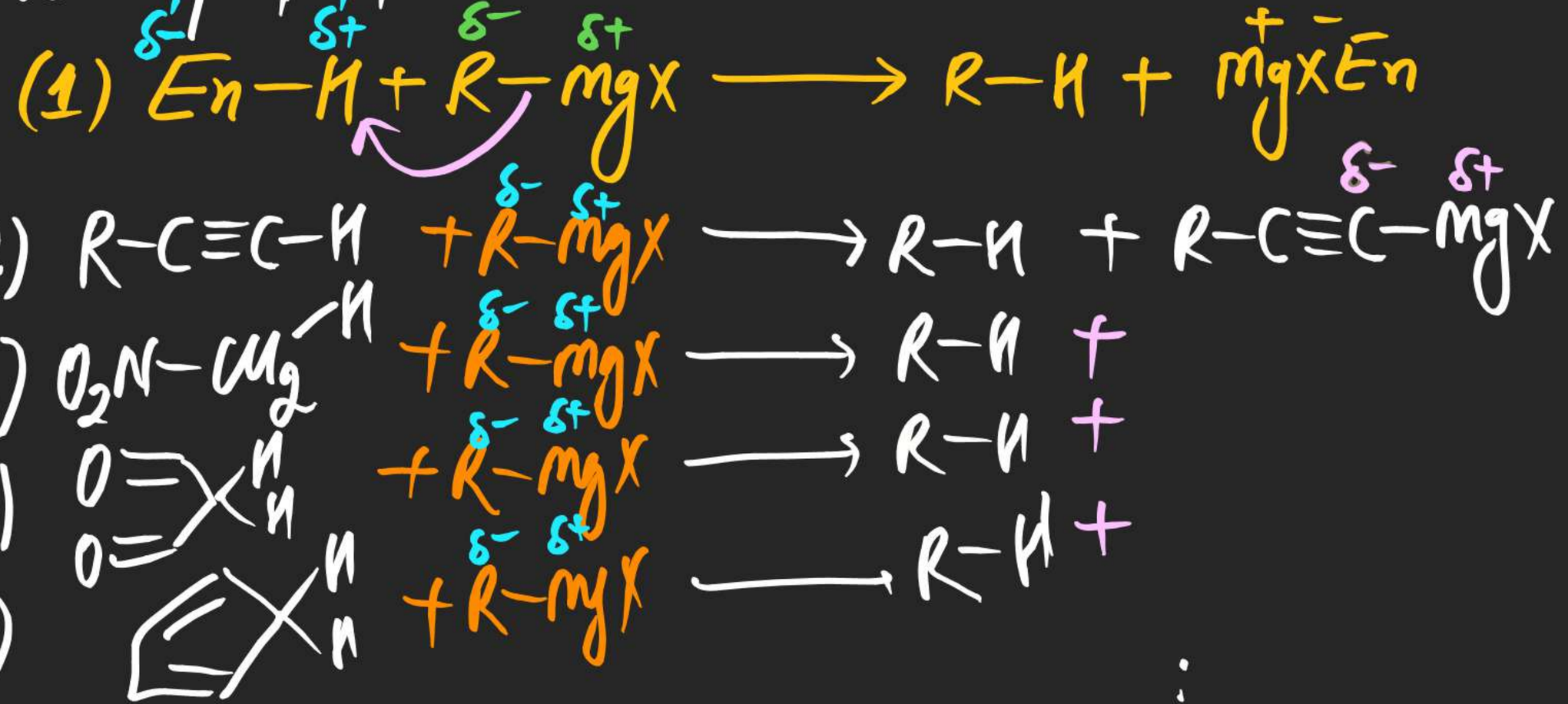
(3)  $+ Mg \longrightarrow$ "

(4)  $+ Mg \xrightarrow[THF]{"}$ 

Nishant Jindal

Reactions shown By Grignard Reagent!-

(1) **Acid Base Reaction:** Since G.R can behave like Base hence it always prefer to show Acid-Base Reaction.



Nishant Jindal

(2) Nucleophilic Addition / Nucleophilic Substitution Reaction :-

YouTube

NUCLEUS EDUACADEMY / SKMSIR

HW: Substitution Sheet

Ex-2 Start next 50 Q

BB Isomerism

Ad. (1-40) Question discussion