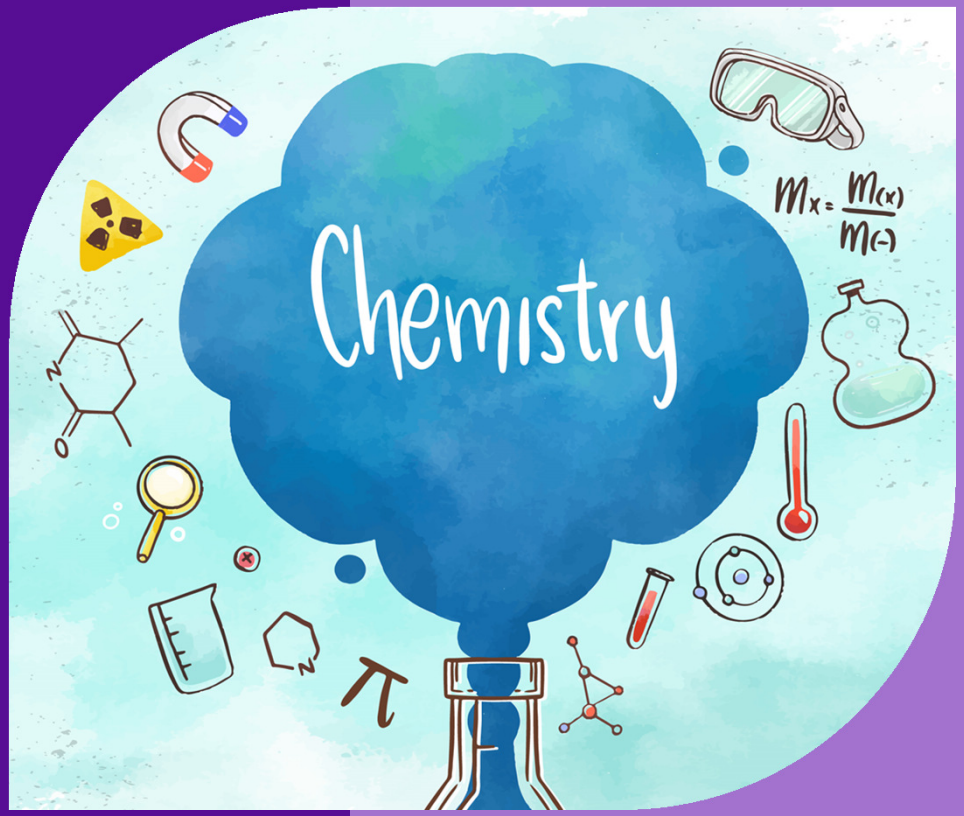
CLASS XII ACADEMIC PROGRAM 2020

CHEMISTRY 2ND PAPER

LECTURE : C 08

CHAPTER 2 : ORGANIC CHEMISTRY (Alkane)

Sadat Ahmed Dipro



Covalent Bond Fission

(i) Homolytic Fission (equal) → # Free Radical

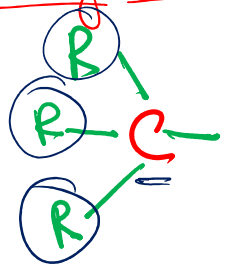
(ii) Heterolytic Fission (not equal)

Mechanism (HSCX)

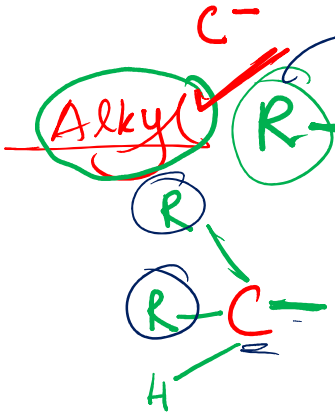
Carbocation C^+

Carbanion C^-

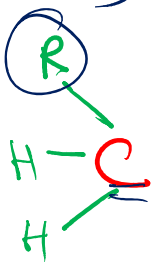
Degree:



3° Tertiary

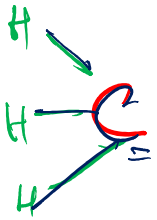


2° Secondary



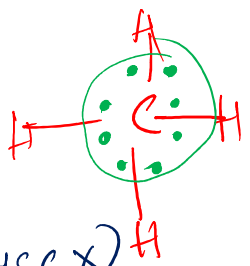
1° Primary

Alkyl group directly connected?



0° X 1° X

CH_3- methyl



no lone pair

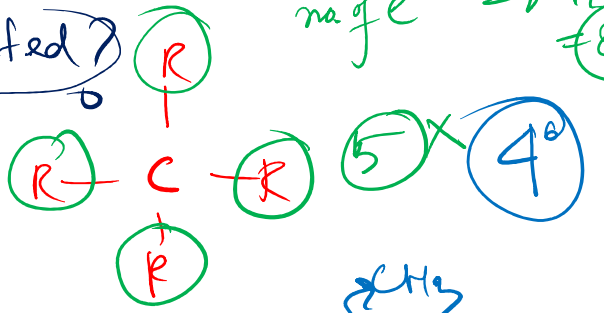
4 Cov. bond

4 bp e⁻

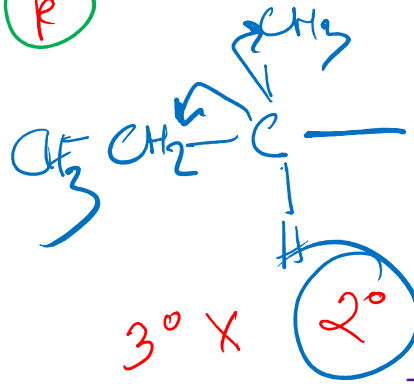
A — B

bond 4 → bp e⁻ → 4

no of e⁻ → 4×2 = 8



5 × 4°

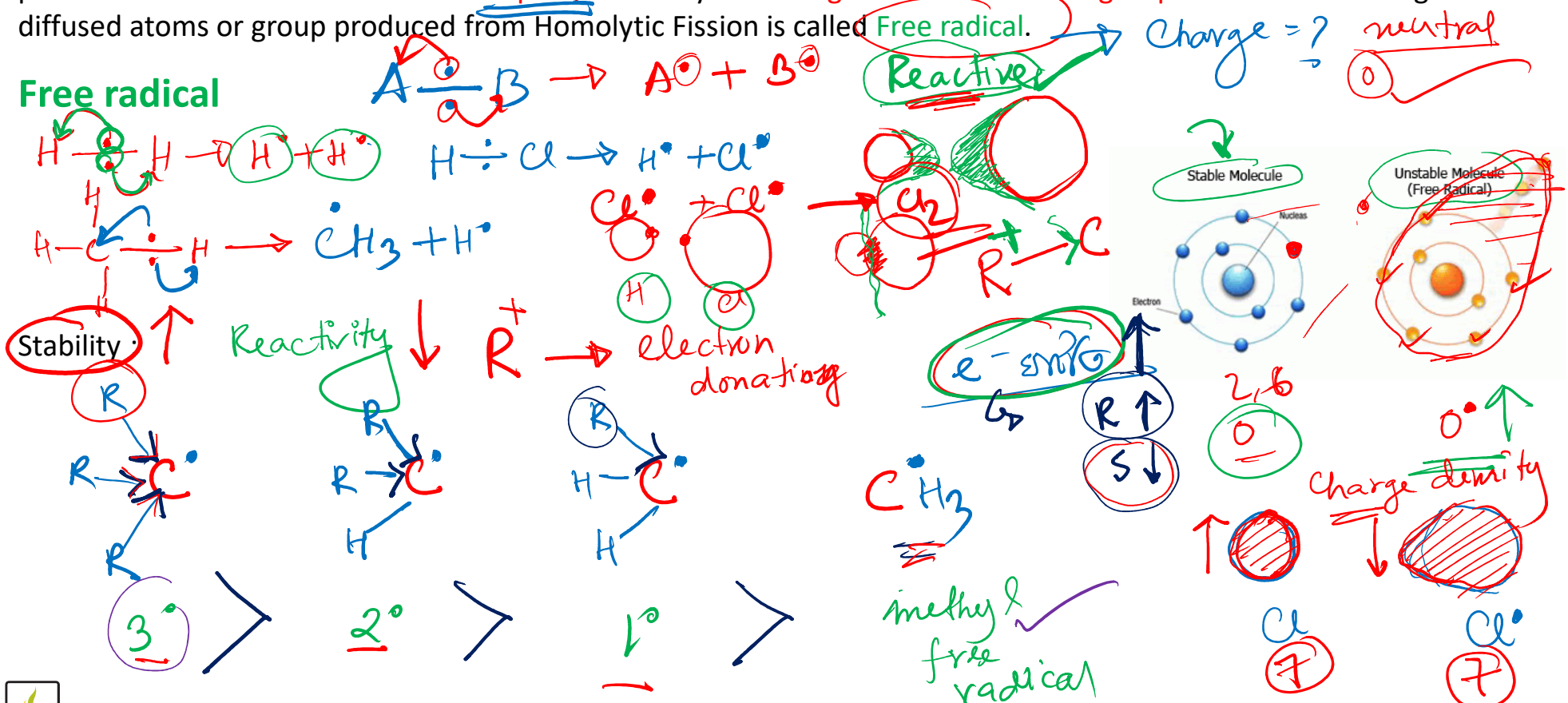


3° X 2°

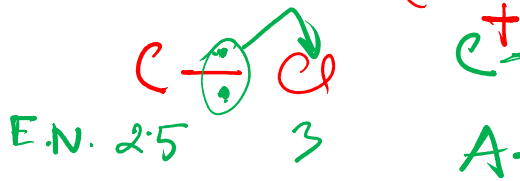
Homolytic Fission

In this kind of fission two atoms or groups creating the covalent bond receives one electron each from the electron pair. So the electrons are distributed equally. This way two charge diffused atoms or groups are created. Charge diffused atoms or group produced from Homolytic Fission is called Free radical.

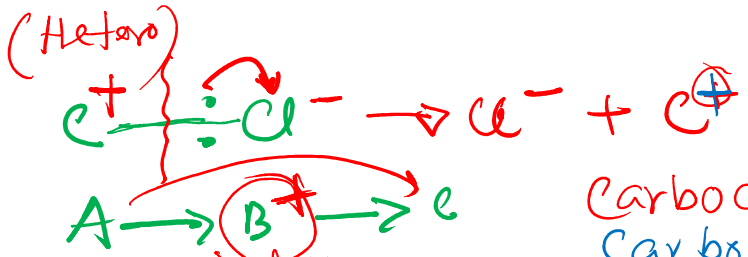
Free radical

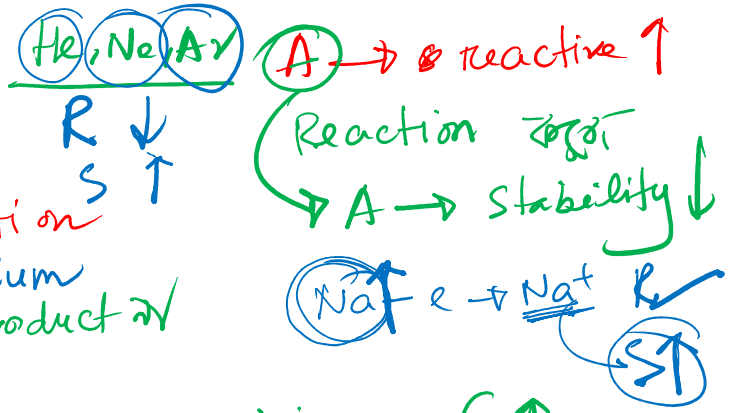


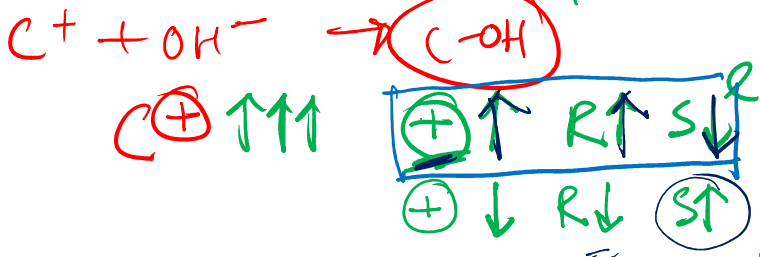
Carbocation

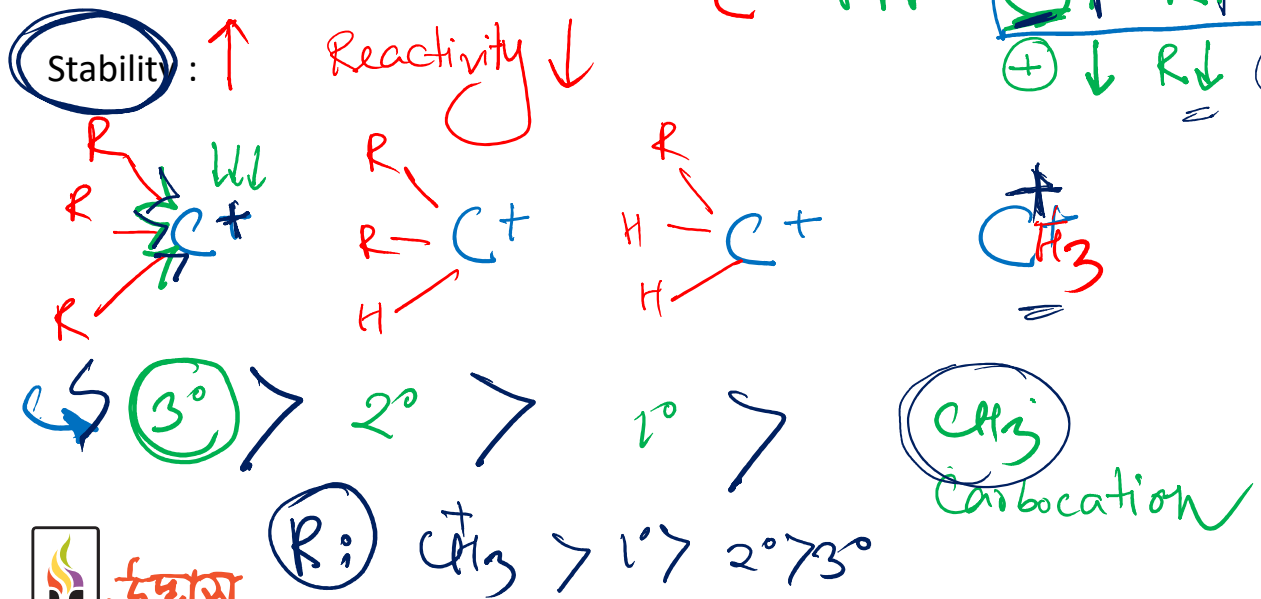


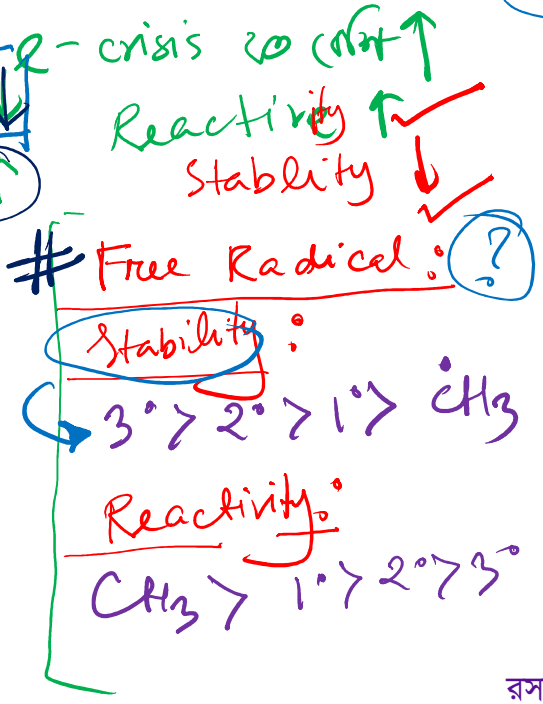
- Intermediate phase
- Highly reactive



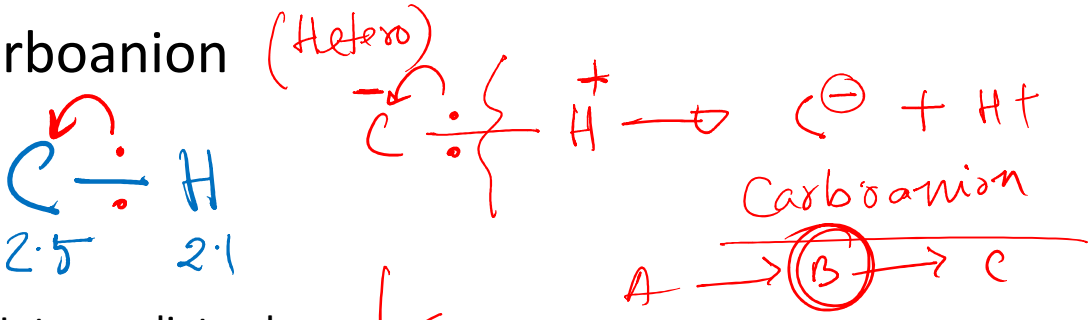




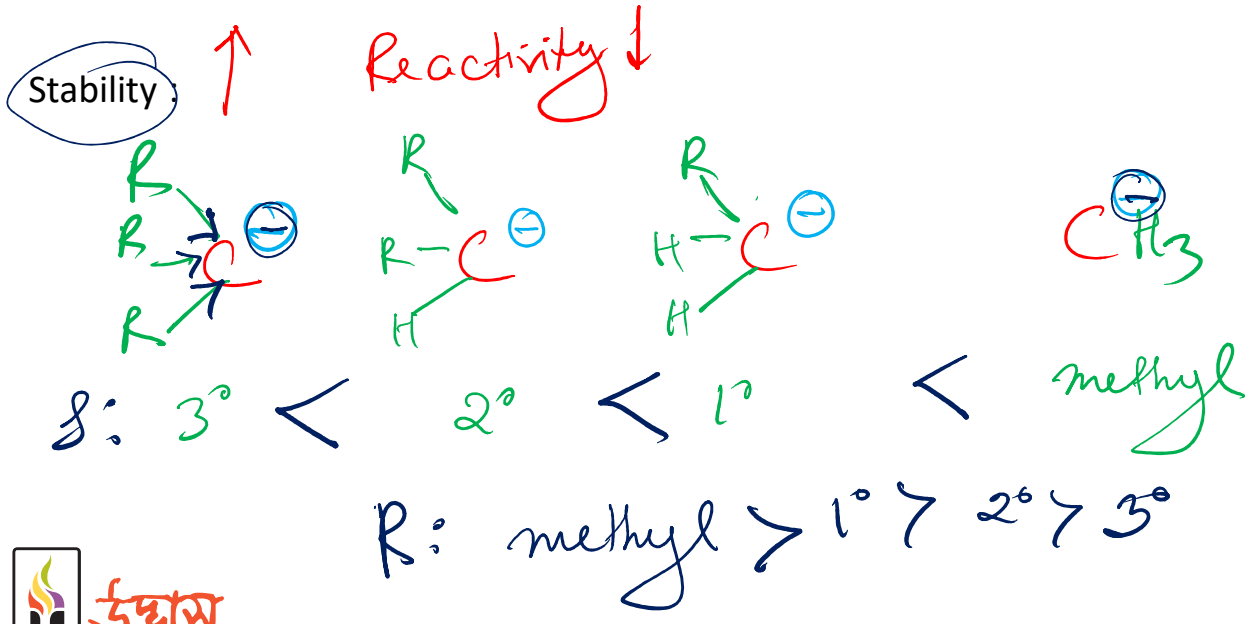


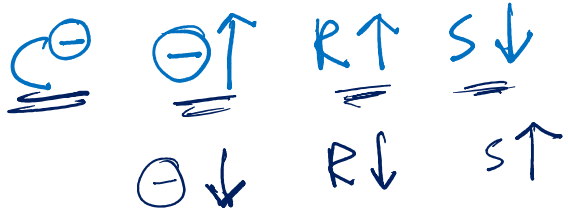


Carboanion



- Intermediate phase
- Highly reactive





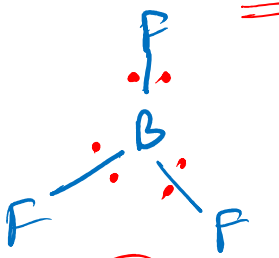
Organic Reagents

Electrophilic → Ep.

+ → − e⁻ গ্রহণ করে

H^+, NH_4^+, CH_3^+

Octet Compress. (6) e⁻



$BeCl_2$

(4)

6e⁻ 8↓

Nucleophlic → Np.

− → + e⁻ দান করে

OH^-, Cl^-, CH_3^-

Octet Expansion → 10

PCl_5 → 10 e⁻ ↑ extra e⁻

e⁻ donating group

Lone pair থাকে

NH_3 H_2O

Org + Org / InOrg

8 → Octet

8↓ C 8↑

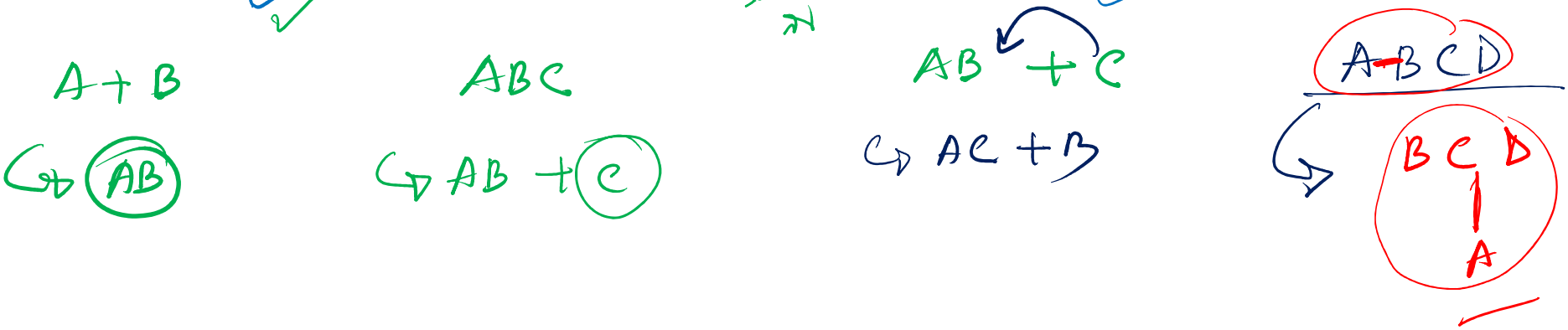
$NH_4^+ + Cl^- \rightarrow NH_4Cl$

Organic Reaction

Details

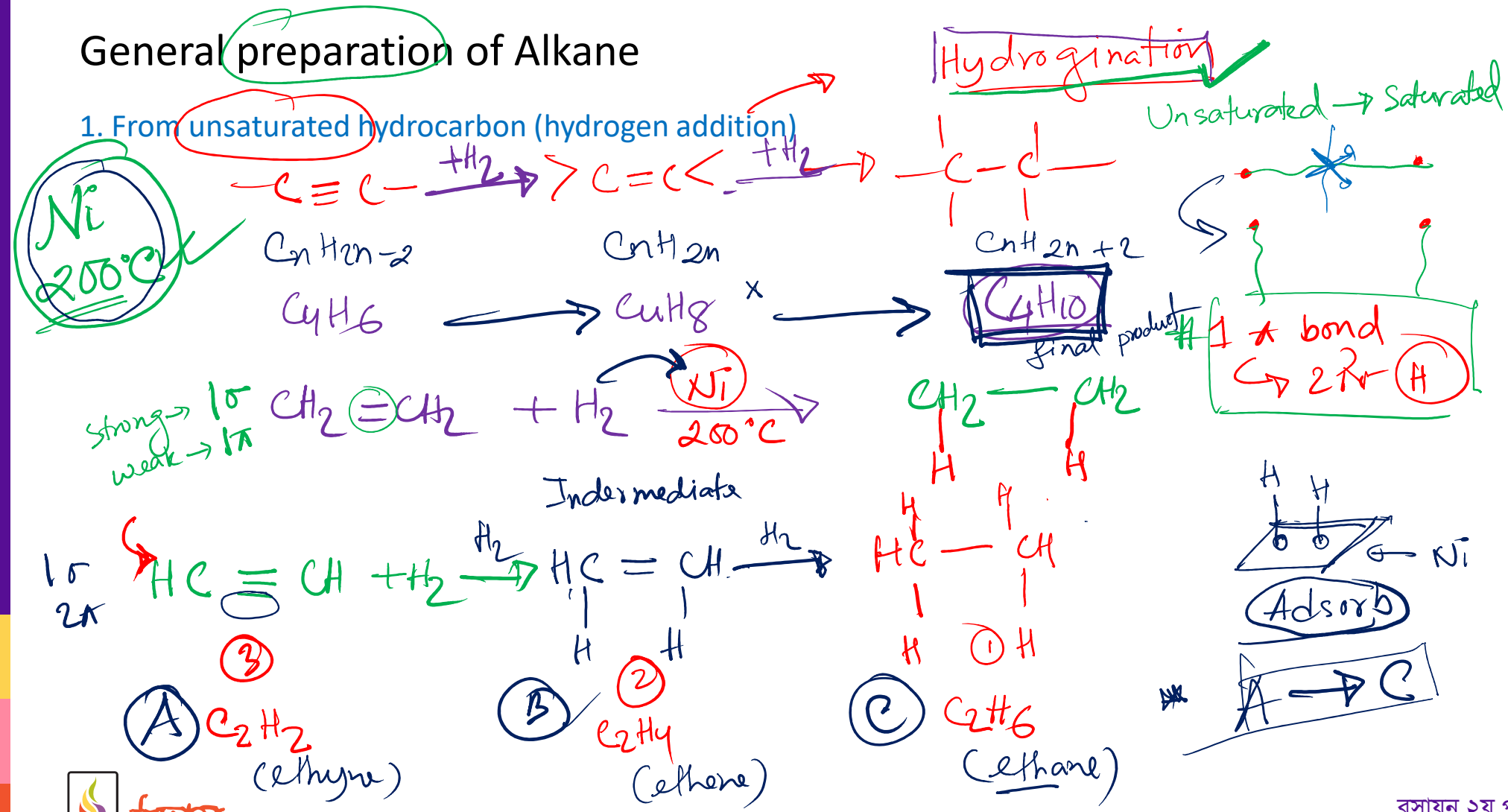
Alkane
Alkene / Alkyne

- Addition
- Elimination ⟷ same
- Substitution
- Isomeric



General preparation of Alkane

1. From unsaturated hydrocarbon (hydrogen addition)



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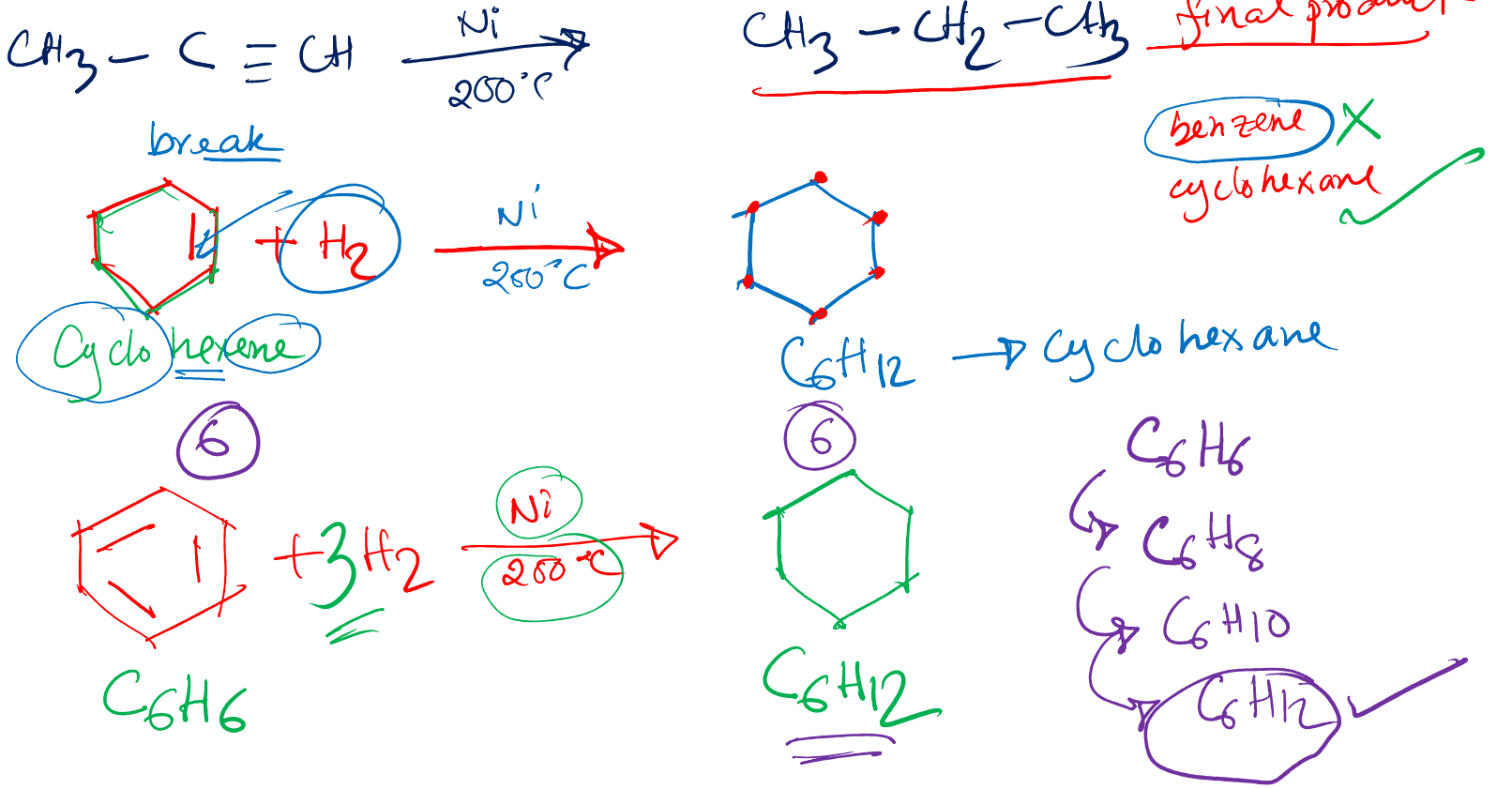
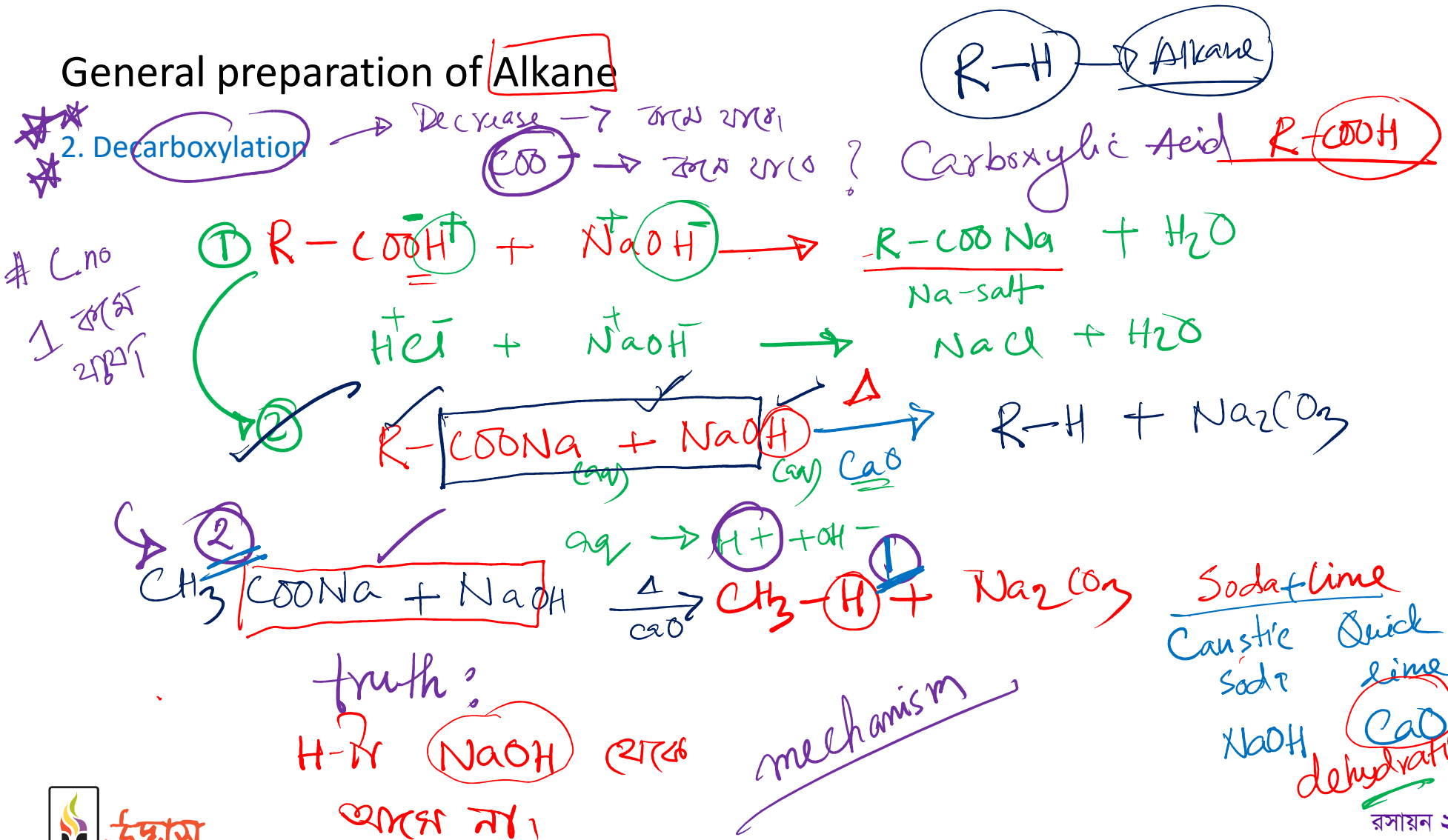


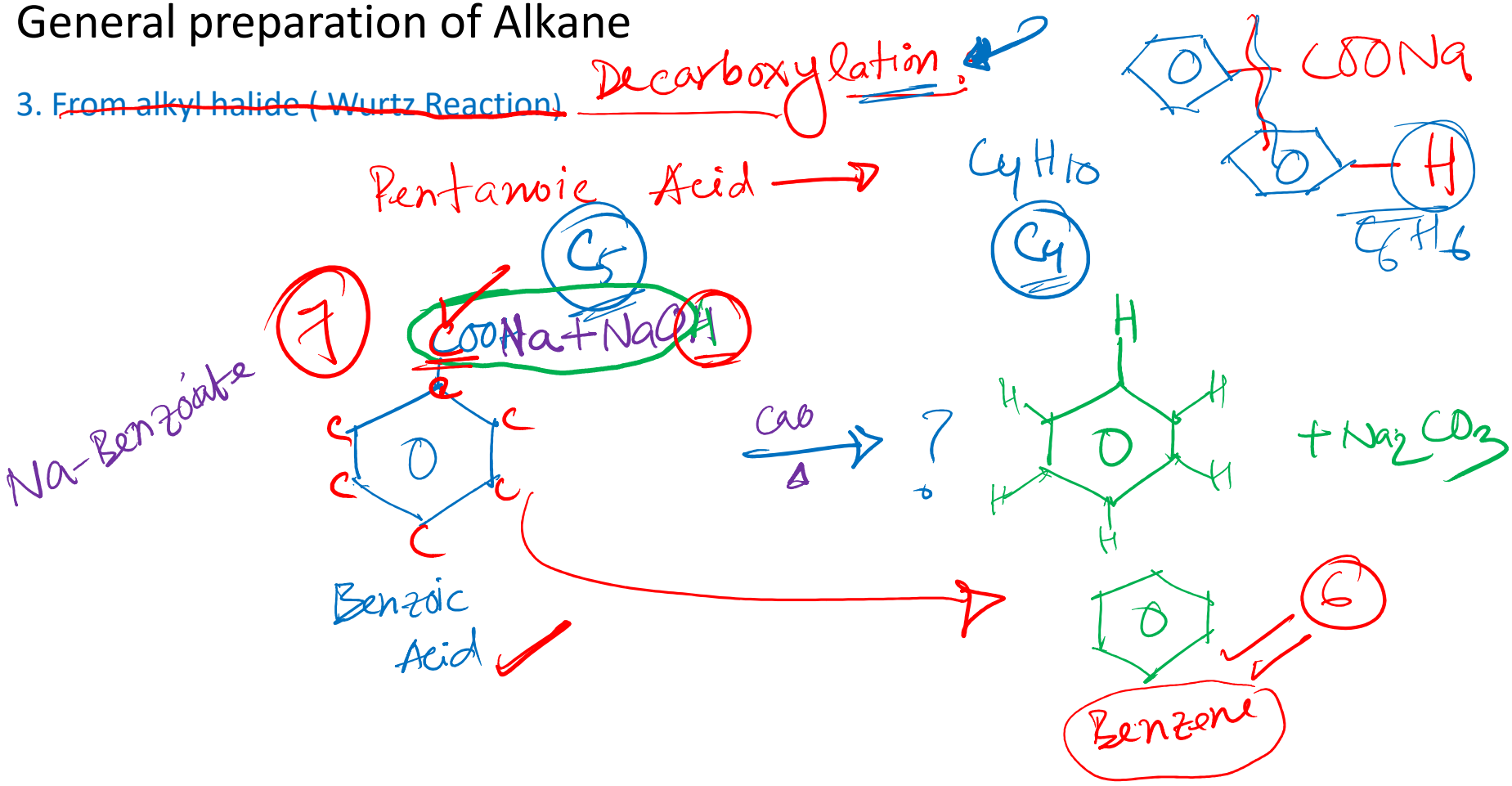
General preparation of Alkane

2. Decarboxylation



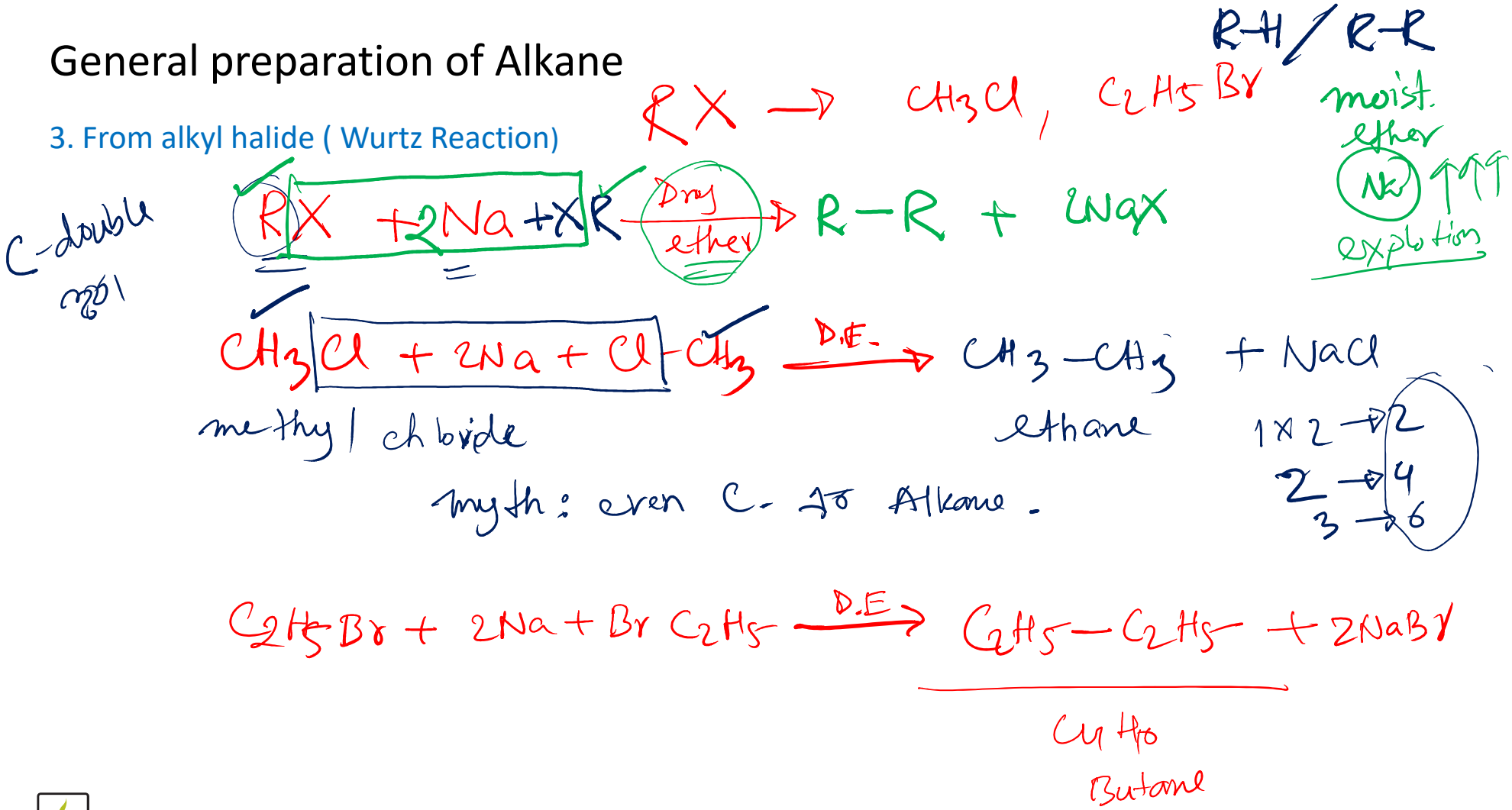
General preparation of Alkane

3. ~~From alkyl halide (Wurtz Reaction)~~ Decarboxylation



General preparation of Alkane

3. From alkyl halide (Wurtz Reaction)



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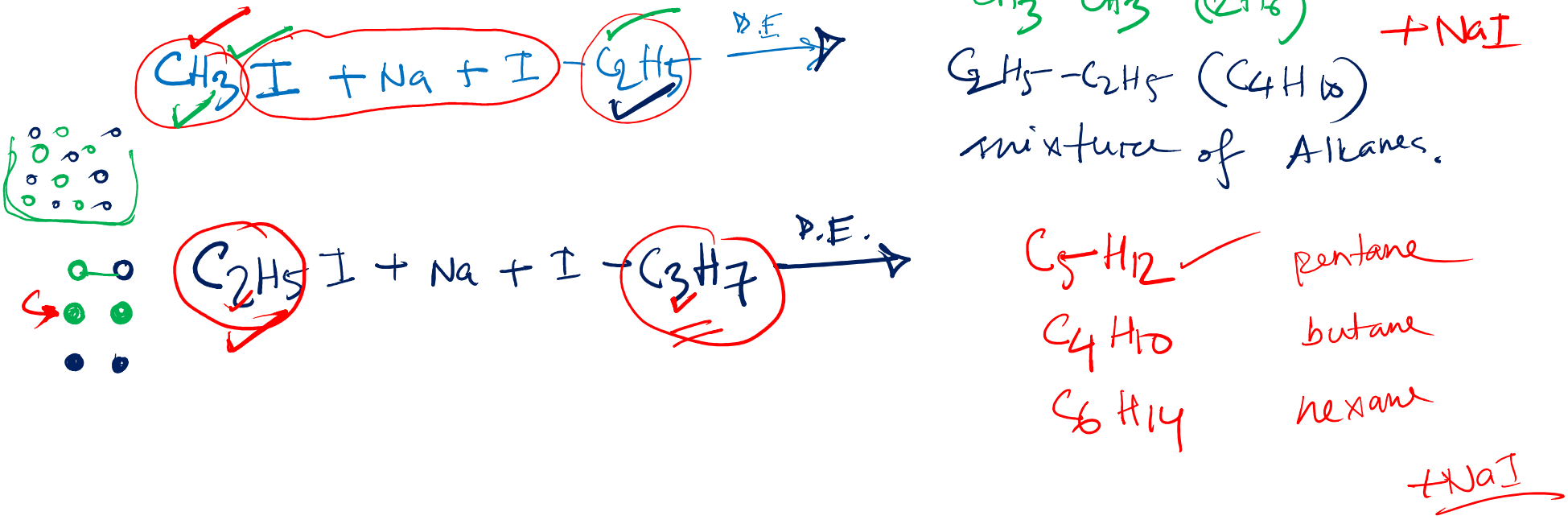
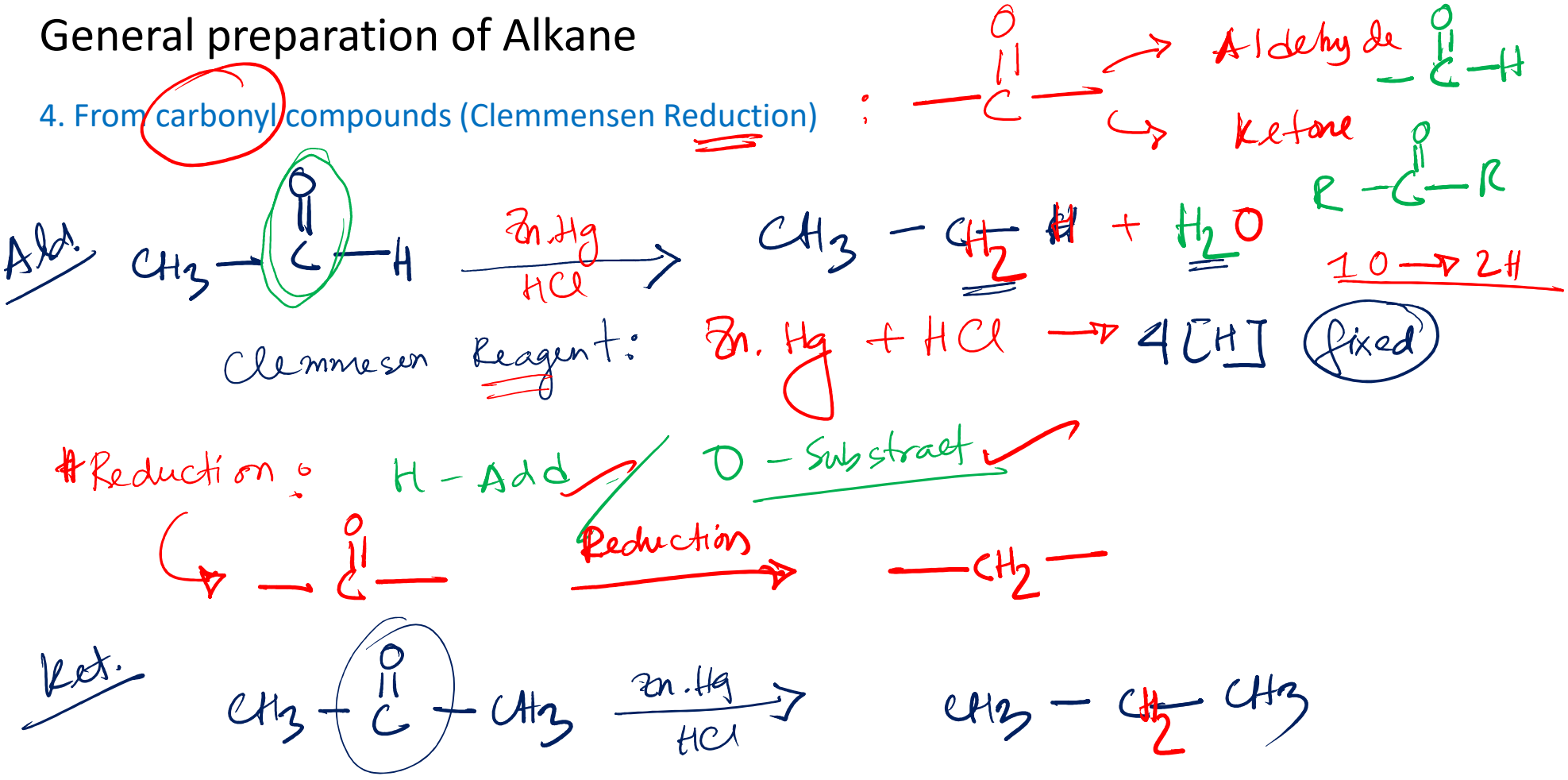


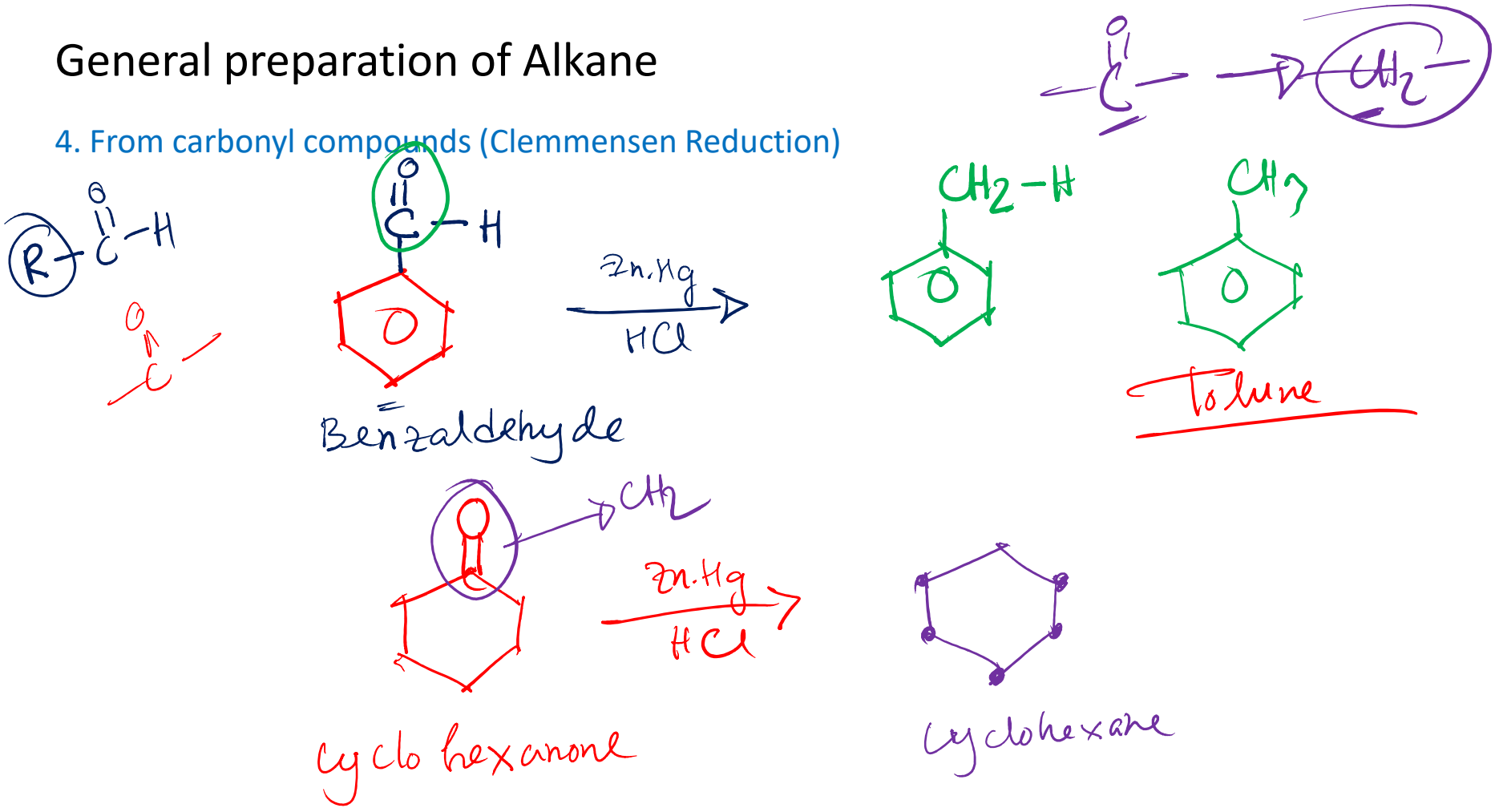
General preparation of Alkane

4. From carbonyl compounds (Clemmensen Reduction)



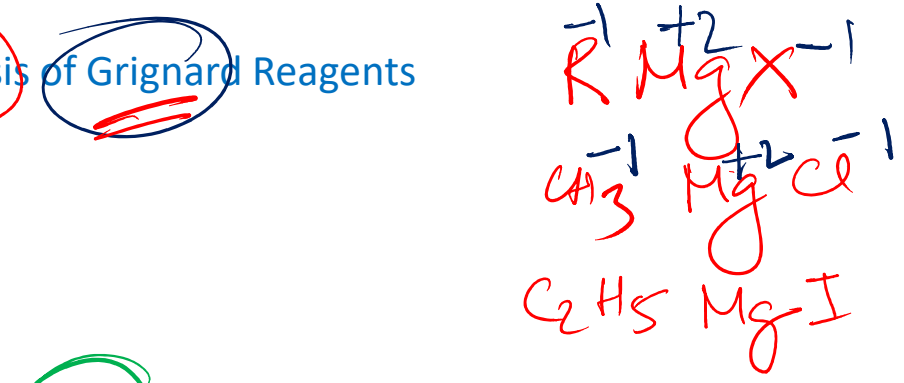
General preparation of Alkane

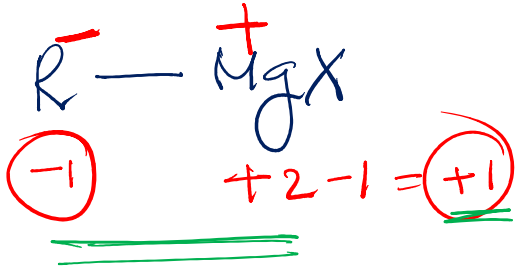
4. From carbonyl compounds (Clemmensen Reduction)

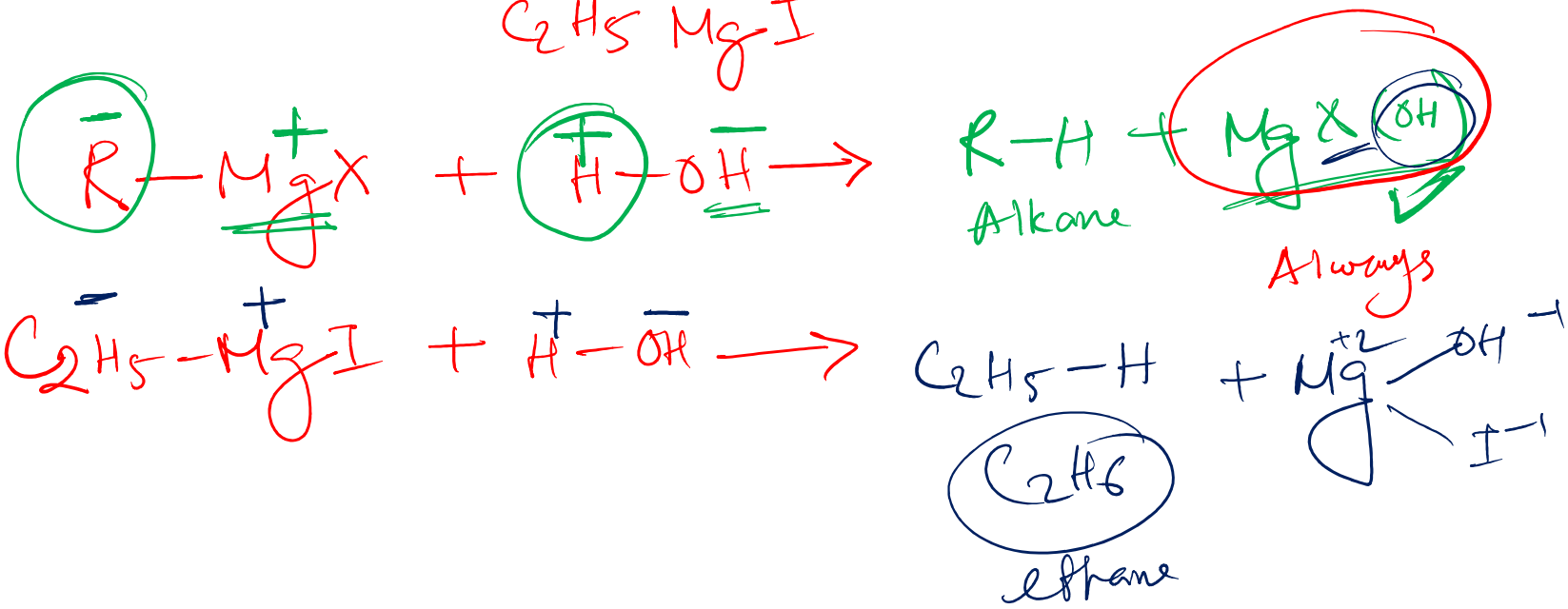


General preparation of Alkane

5. By Hydrolysis of Grignard Reagents







Chemical Reactions of Alkane

Paraffin
Para + Affin
Little

Alkane shows four types of reaction.Example,

(i) Substitution Reactions

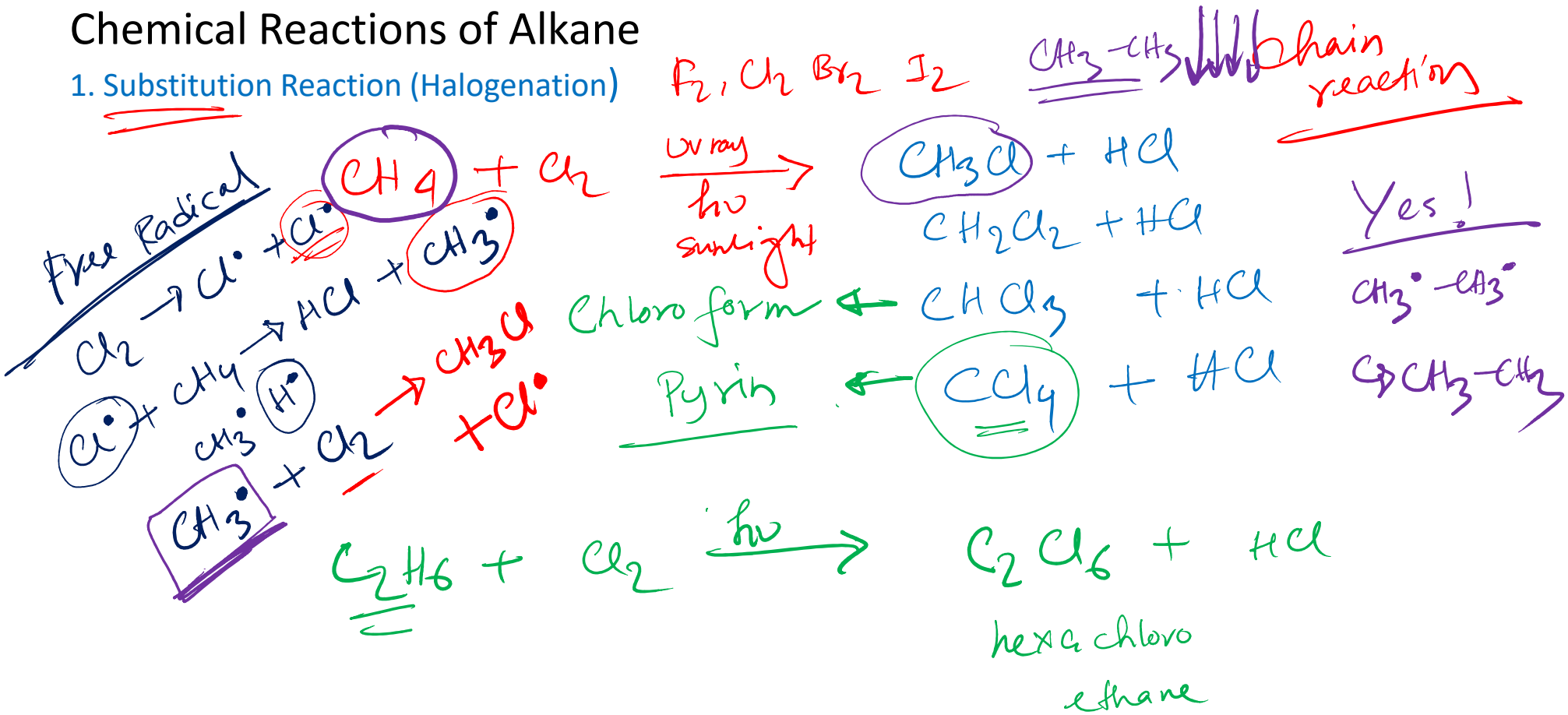
(ii) Thermal Reactions

(iii) Isomerisation Reactions

(iv) Aromatization

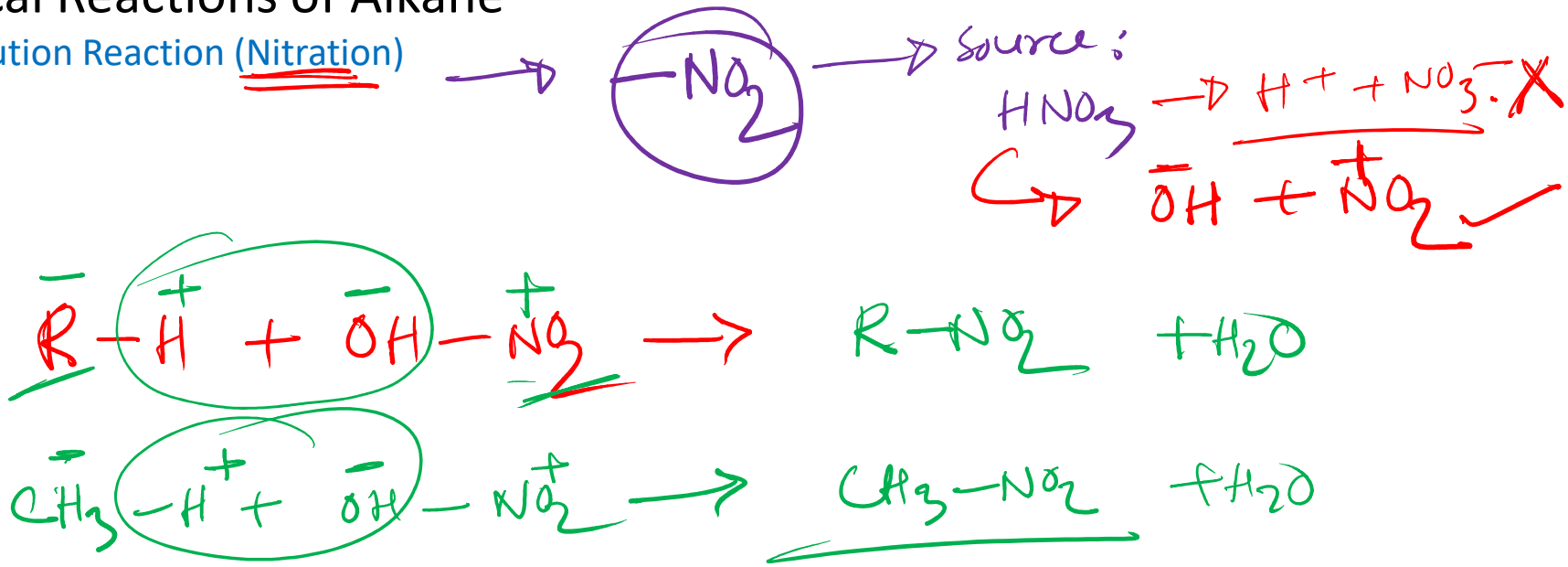
Chemical Reactions of Alkane

1. Substitution Reaction (Halogenation)



Chemical Reactions of Alkane

1. Substitution Reaction (Nitration)



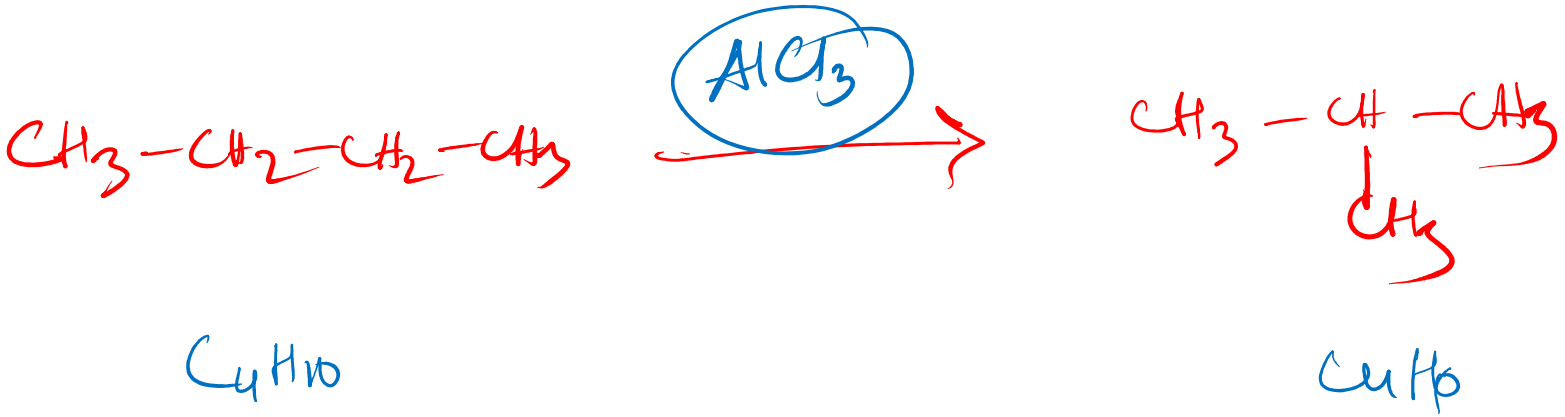
Chemical Reactions of Alkane

2. Thermal Reactions (Combustion/Oxidation)

$$CH_4 + O_2 \rightarrow CO_2 + H_2O + \text{heat}$$

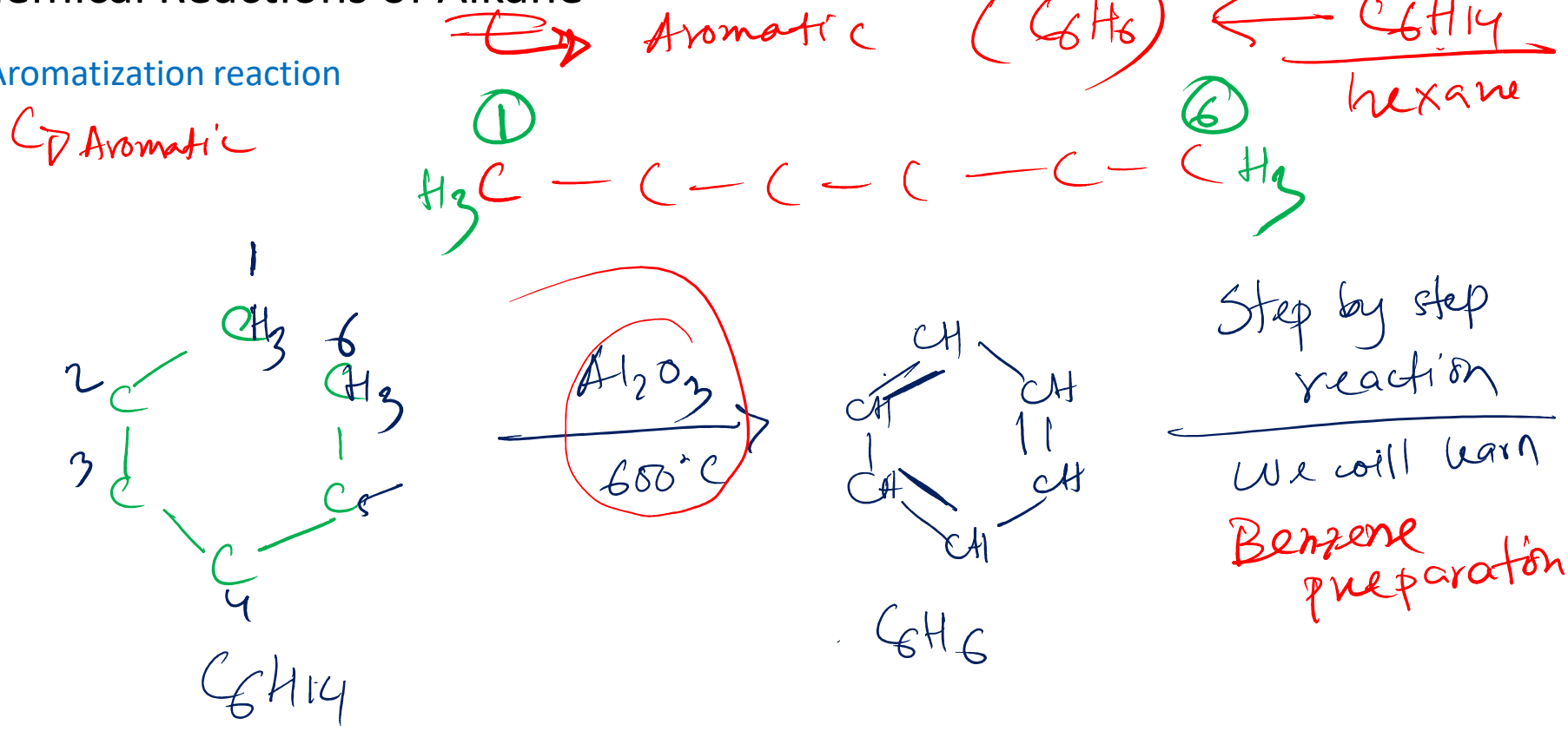
Chemical Reactions of Alkane

3. Isomerization reaction



Chemical Reactions of Alkane

4. Aromatization reaction



লেগে থাকো সৎ ভাবে,
স্বপ্ন জয় তোমারই হবে।