تلخيص لجميع تفاعلات جزئية الميد الأول والثاني.

- **Saytzeff's Rule:**

* " لو أنّ هناك أكثر من ألكين يمكن أن ينتج من تفاعل استبعاد، سيكون الألكين الأكثر ثباتًا هو الناتج الغالب ". بالأحرى إزالة الهايدروجين من الكربون التيرشري أولاً ثم السكوندري ثم البرايمري.

- **Markovnikov's Rule:**

*" عند إضافة هاليد الهيدروجين إلى ألكين غير متماثل فإن الهيدروجين يضاف إلى الكربون المتصلة بعدد ذرات هيدروجين أكثر، بينما الهالوجين يضاف إلى الكربون المرتبط بذرات هيدروجين أقل. "

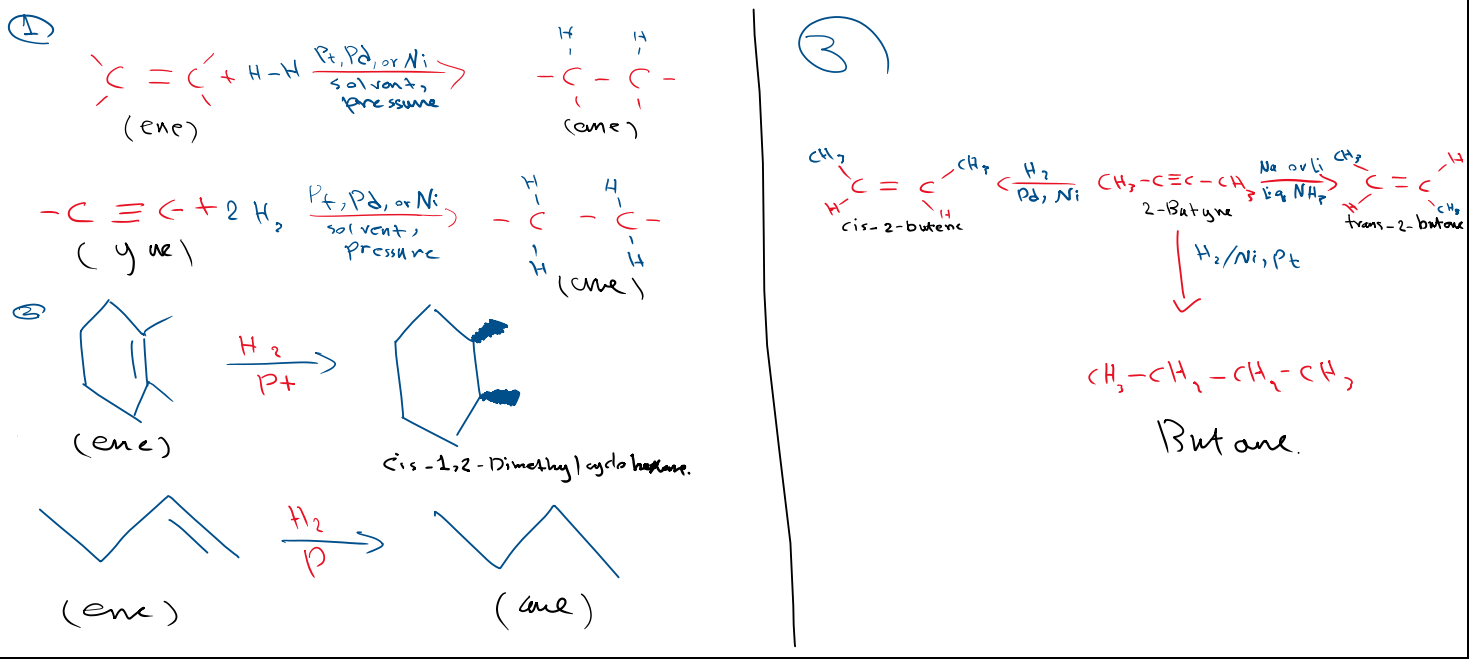
- H^+ : Acid.

- OH^- : Base

- Δ : Heat

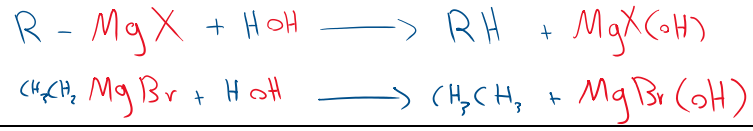
1- Hydrogenation of Alkenes and Alkynes :

- Preparation of Alkanes ①
- Reaction of Alkenes ②
- Reaction of Alkynes ③



2- Hydrolysis of Grignard Reagent :

- Preparation of Alkanes

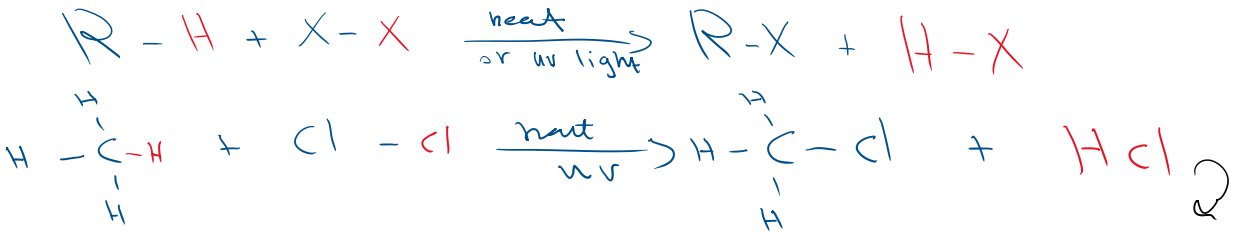


3- Coupling of Alkyl halides with di-alkyl cuprate (All kind of Alkanes) :

- Preparation of Alkanes

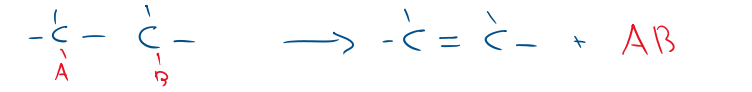
4- Halogenation of Alkane:

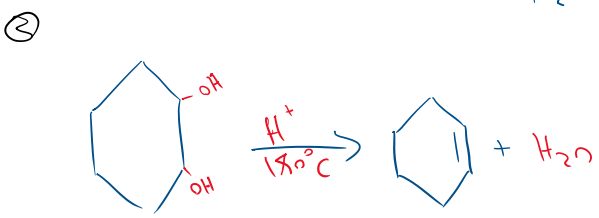
- Reaction of Alkanes

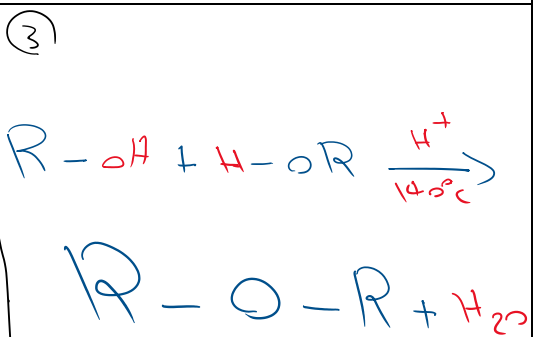


5- Dehydration of Alcohols:

- Preparation of Alkenes ①
- Reaction of Alcohols ②
- Preparation of Ether ③

① 

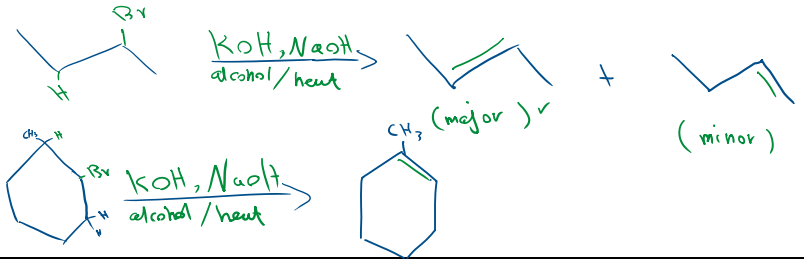
② 

③ 

1- H^+ ⇝ (H_2SO_4 , H_3PO_4)
2- Δ ⇝ (180° C in Alkenes and Alcohols but 140° in Preparation of Ether)
3- Follow ***Saytzeff's Rule***.

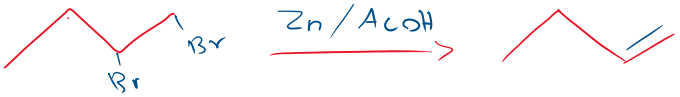
6- Dehydrohalogenation of Alkyl Halides: (Alkenes)

- Preparation of Alkenes



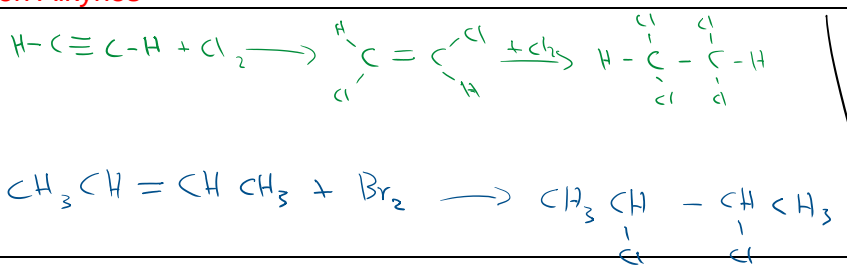
7- Dehalogenation of Vicinal Dibromides:

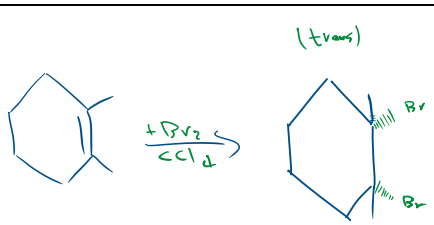
- Preparation of Alkenes



8- Addition of Halogen: Halogenation (Alkenes).

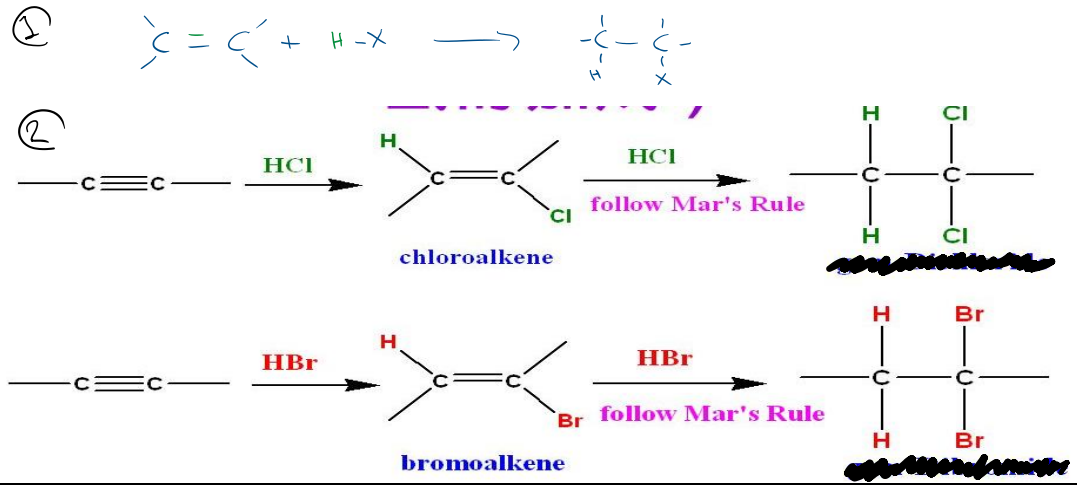
- Reaction of Alkenes
- Reaction Alkynes





9- Addition of Hydrogen Halide:

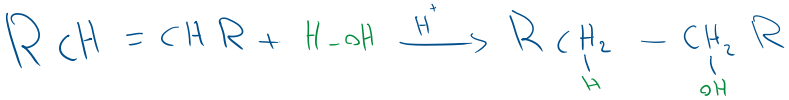
- Reaction of Alkenes ①
- Reaction of Alkynes ②



- Follow ***Markovnikov's Rule.***

10- Addition of water (Hydration) of Alkenes:

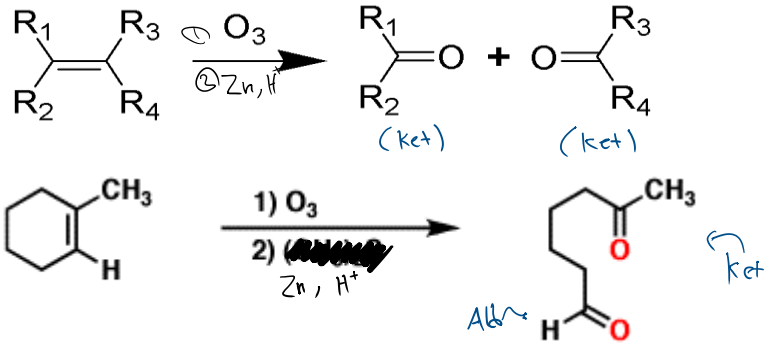
- Reaction of Alkenes
- Preparation of Alcohols



1- Follow ***Markovnikov's Rule.***
2- It's **not** possible to prepare primary Alcohols, EXCEPT "Ethanol"

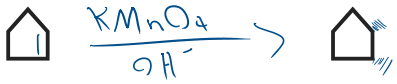
11- Ozonolysis of Alkenes:

- Reaction of Alkenes
- Preparation of Aldehydes & Ketones



12- Oxidation Using $KMnO_4$:

- Reaction of Alkenes
- Preparation of Alcohols



13- Dehydrohalogenation of Alkyl Halides: (Alkynes)

- Preparation of Alkynes

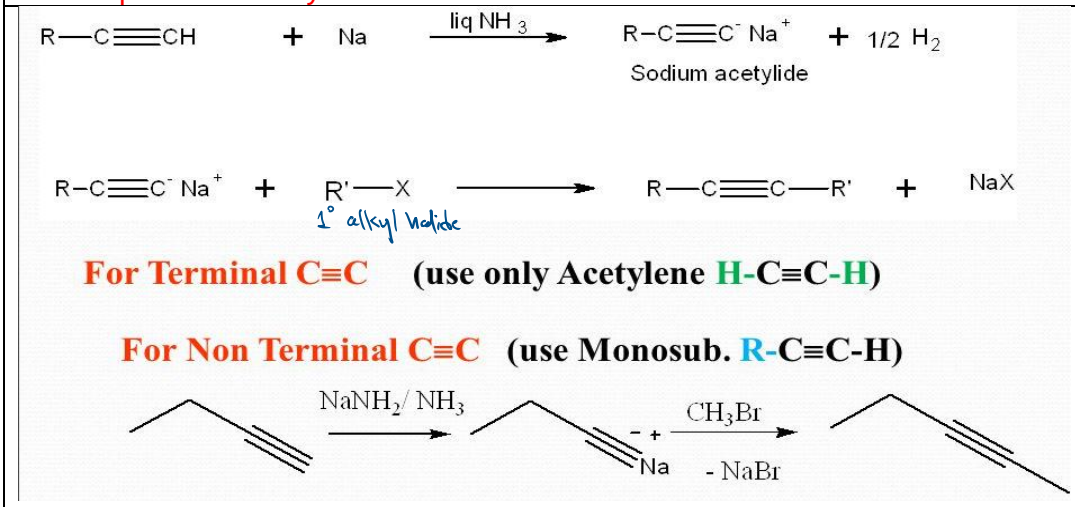
1- Geminal:

2- Vicinal:

- **Geminal dihalide** is (two halogens attached to the same carbon).
- **Vicinal dihalide** is (two halogens attached to adjacent carbons).

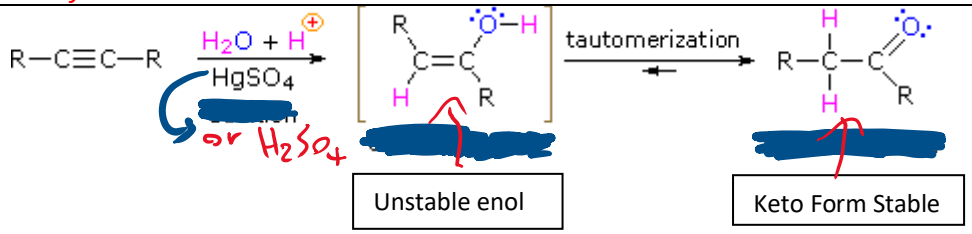
14- Reaction of Sodium Acetylide with Primary Alkyl Halides:

- Preparation of Alkyne



15- Addition of water (Hydration) of Alkynes:

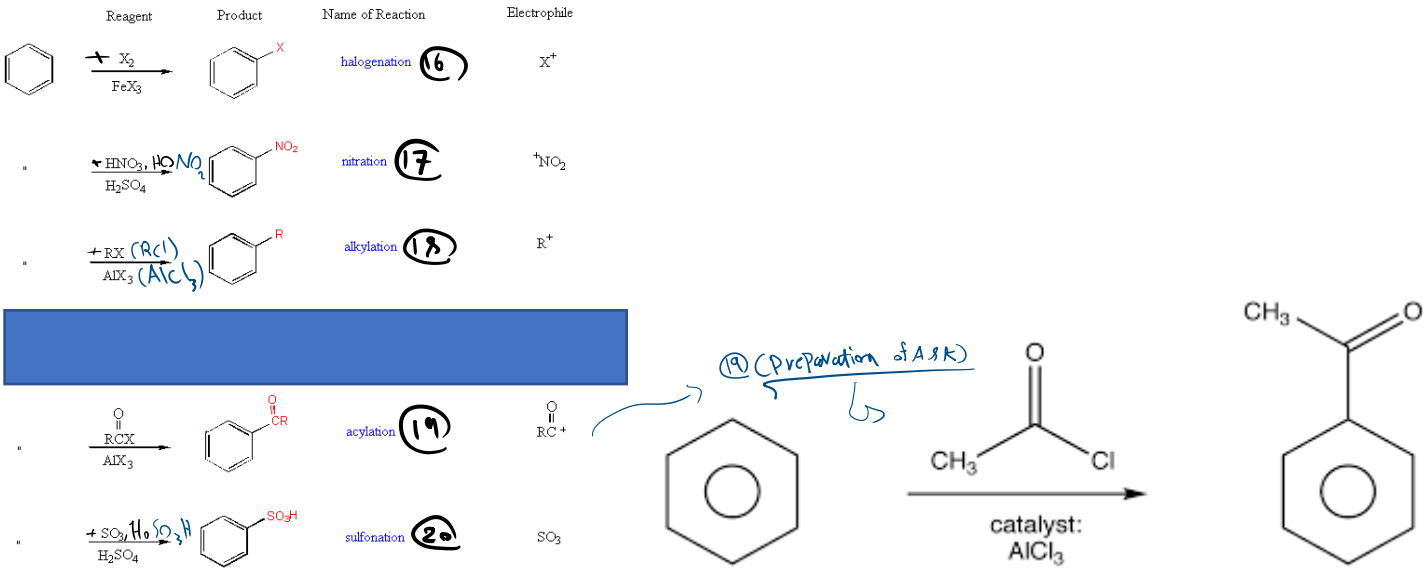
- Reaction of Alkynes
- Preparation of Aldehydes & Ketones



- Electrophilic Aromatic Substitution Reaction:

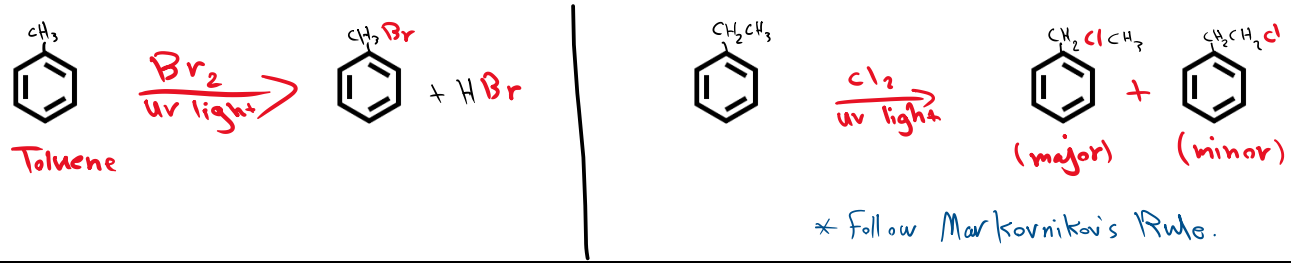
16- Halogenation
17- Nitration
18- Alkylation (Friedel-Crafts)
19- Acylation (Friedel-Crafts)
20- Sulfonation

- Reaction of Benzene
- Preparation of Ald & Ket (19)



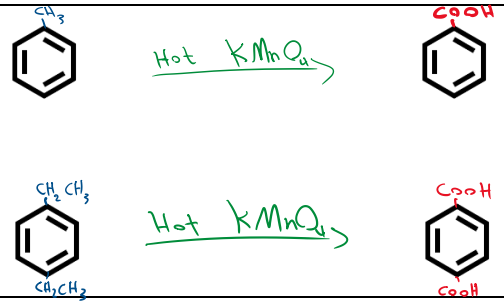
21- Halogenation of an Alkyl Side Chain: (Aromatic)

- Reaction of Benzene



22- Oxidation of Alkyl Side Chain: (Aromatic)

- Reaction of Benzene



- Hot Potassium**

23- Nucleophilic Substitution of Alkyl Halides:

- 1- Preparation of Alcohols
- 2- Reaction of Alcohols

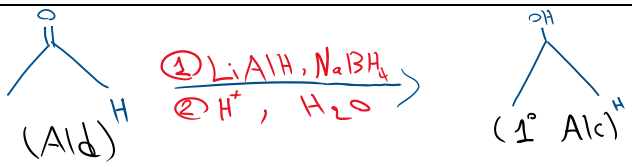
1-

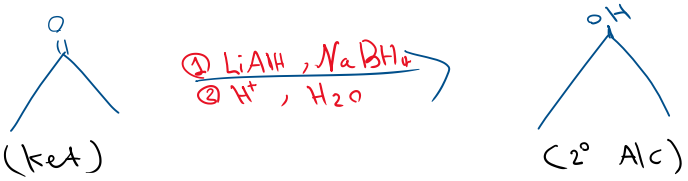
2-

- In the preparation of alcohols we use KOH as a catalyst.

24- Reduction of Ketones, and Aldehydes (Carbonyl compounds):

- Preparation of Alcohols
- Reaction of Ald & Ket

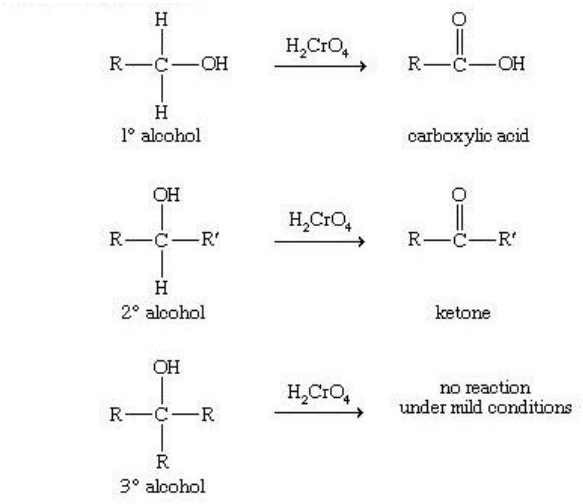


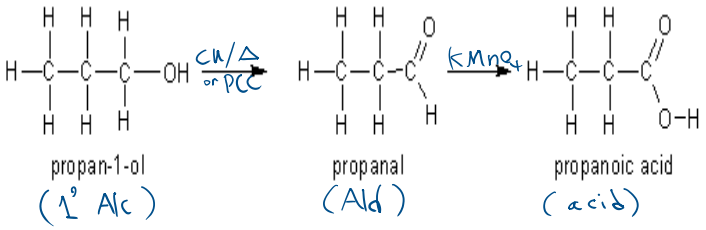


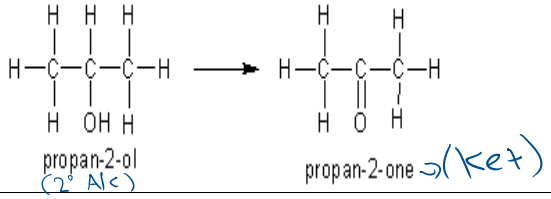
- $LiAlH_4$, $NaBH_4$ are a Strong Reducing agent.
- Aldehydes gives a 1^o Alcohols, and Ketones gives a 2^o Alcohols

25- Oxidation of Primary and Secondary Alcohols and (Carbonyl compound):

- Reaction of Alcohols
- Preparation of Ald & Ket
- Reation of Ald & Ket



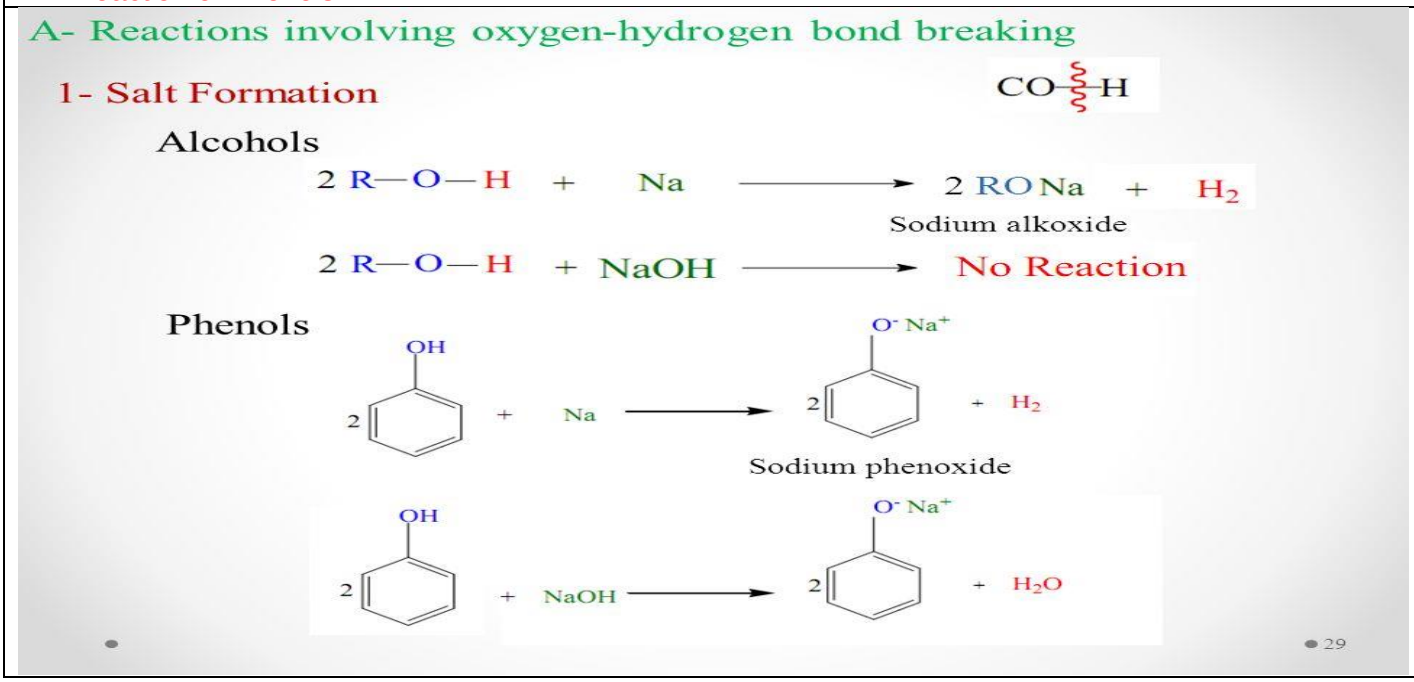




- Primary Alcohols givs Aldehydes, which ma be further oxidized to Carboxylic acid.
- Secondary Alcohols givs Ketones.
- Tertiary Alcohols, **Do Not Undergo Oxidation**.
- Ketones and Aldehydes Formed when there's either Mild or Stronge oxidizing agents.
- Mild oxidizing agents: CrO_3 , Cu, PCC.
- Stronge oxidizing agents: $H_2Cr_2O_7$, $KMnO_4$

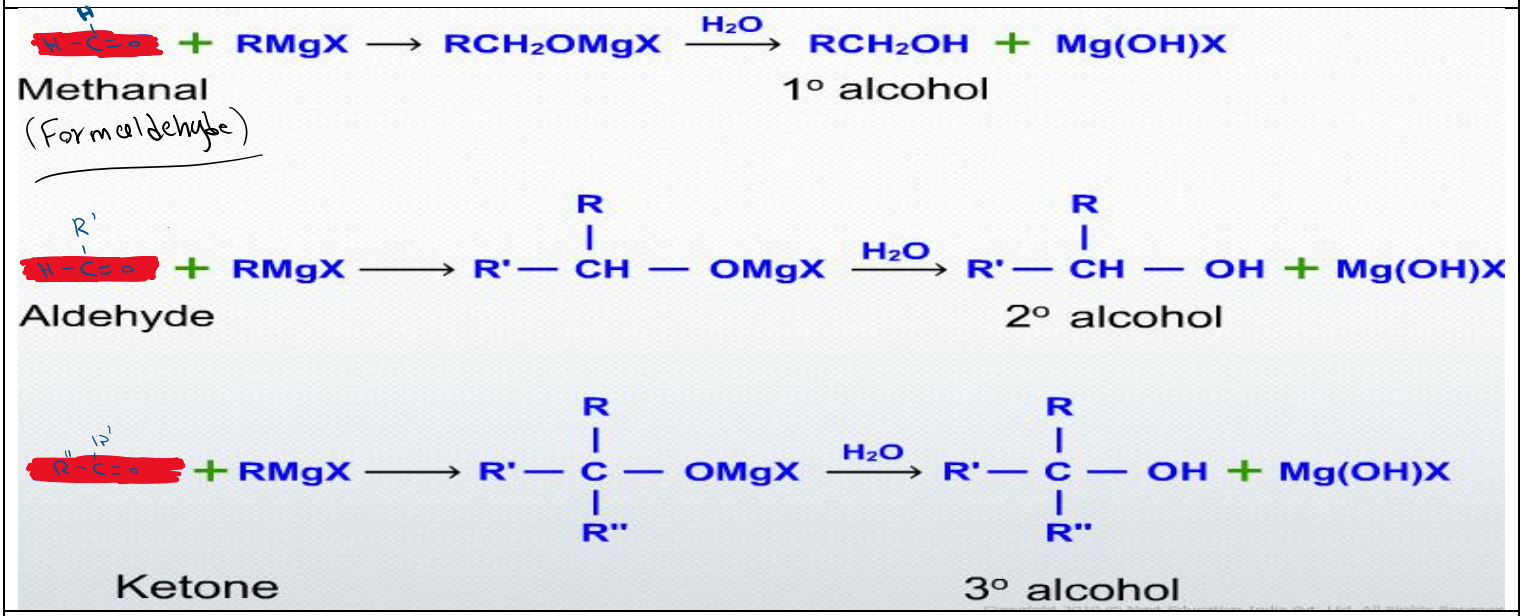
26- Reaction of Alcohols and Phenols as Acids: Salt Formation

- Reaction of Alcohols
- Reaction of Phenols



27- Addition of Grignard's Reagent to Aldehydes and Ketones:

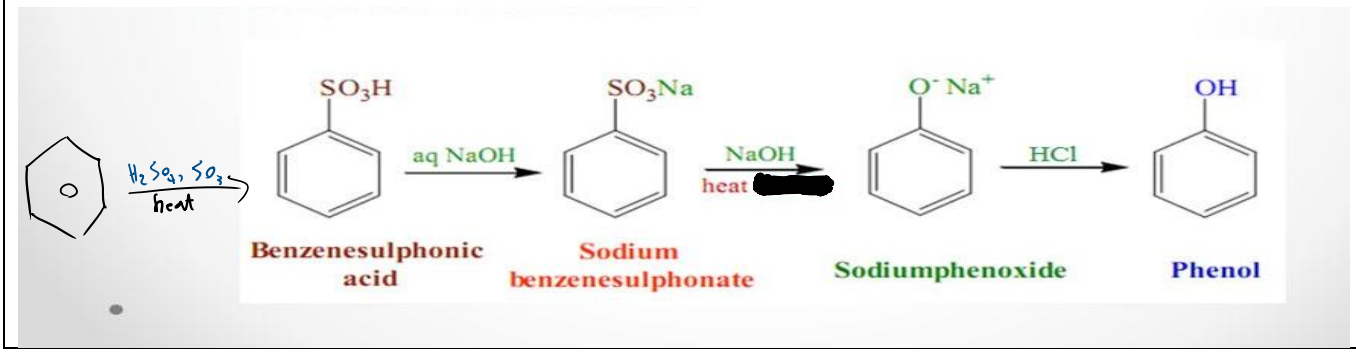
- Preparation of alcohols
- Reaction of Ald & Ket



- Formaldehyde givs a 1° Alcohols.
- Aldehyde givs a 2° Alcohols.
- Ketone givs a 3° Alcohols.

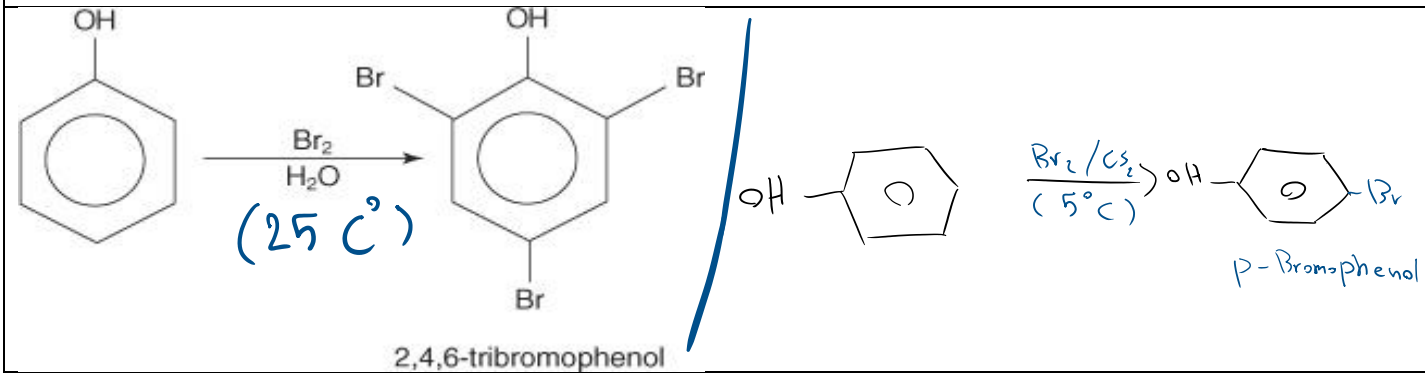
28- The Alkali Fusion of Sulfonates:

- Preparation of Phenols



29- Halogenation takes place without catalyst:

- Reaction of Phenol



30- Williamson Synthesis:

- Preparation of Ethers

① $2\,ROH + 2\,Na \longrightarrow 2\,RO^-Na^+ + H_2$

② $RO^-Na^+ + R'-X \longrightarrow ROR' + Na^+X^-$

- ① An Alcohol is converted to its alkoxide by treatment with a reactive metal (Sodium or Potassium).
- ② Displacement is carried out between the alkoxide and an alkyl halide.
- * The best yields of mixed dialkyl ethers, to select a 1° rather than 2° or 3° alkyl halide and react it with a sodium alkoxide.
- ** Must be careful not to pick a combination in which one of the reagents has a halogen directly attached to an aromatic ring.

31- Cleavage of Ethers by Hot Concentrated Acids:

- Reaction of Ethers

① $R-O-R + H-X \xrightarrow{\Delta} R-OH + RX$

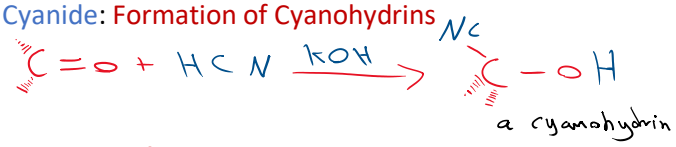
② $R-O-R + (\text{excs } HX) \text{ or } (2\,H-X) \xrightarrow{\Delta} 2\,R-X + H_2O$

32- Nucleophilic Addition Reactions:

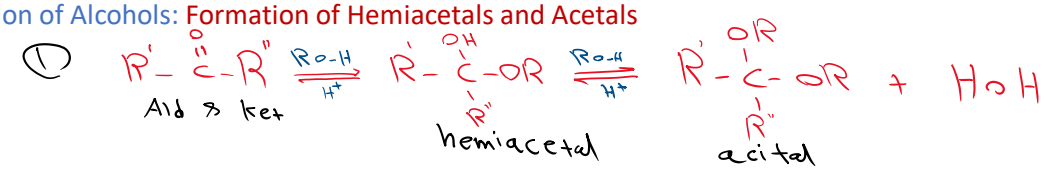
- Reaction of Ald & Ket

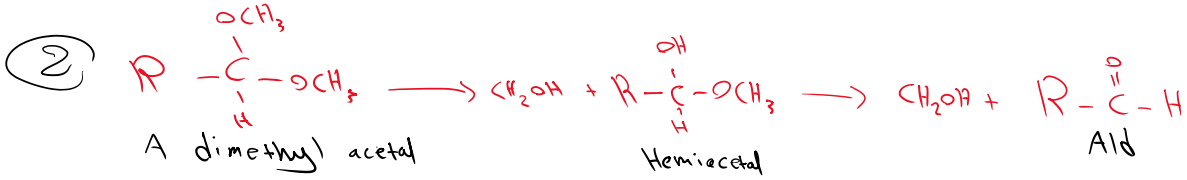
1- (27)

2- Addition of hydrogen Cyanide: Formation of Cyanohydrins

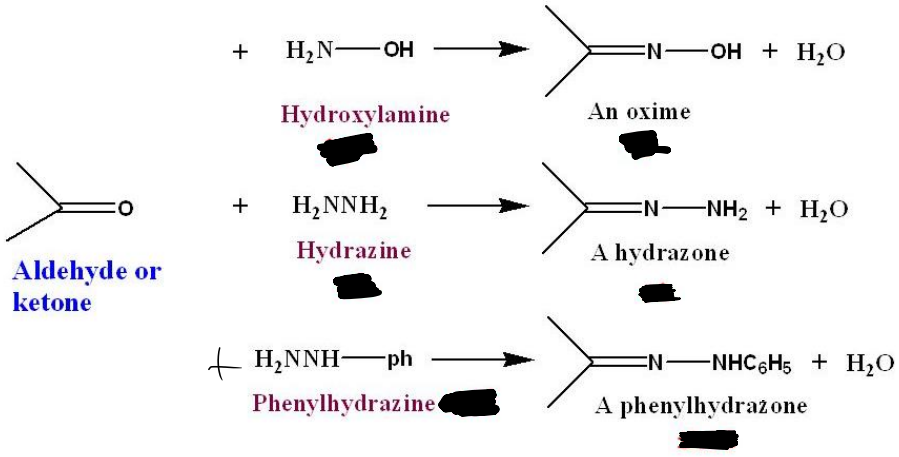


3- Addition of Alcohols: Formation of Hemiacetals and Acetals





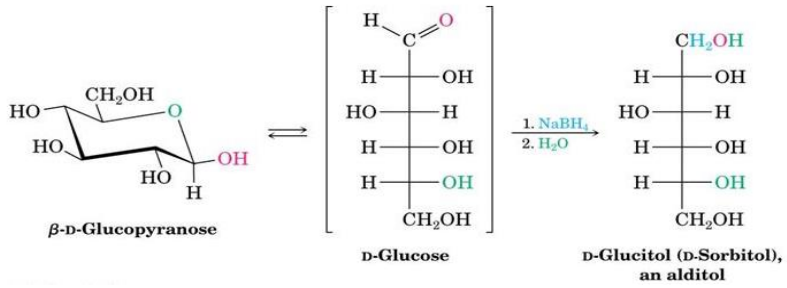
4- Addition of Ammonia and Ammonia Derivatives



33- Reduction of Monosaccharides:

- Reaction of Monosaccharides

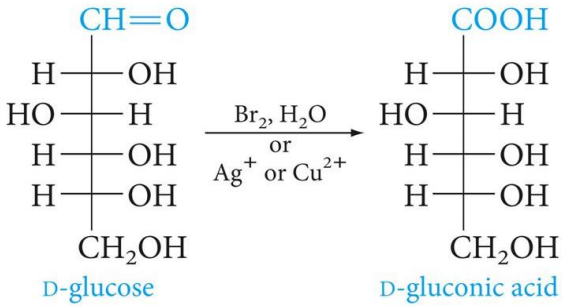
- Treatment of an aldose or ketose with $NaBH_4$ reduces it to a polyalcohol (alditol)



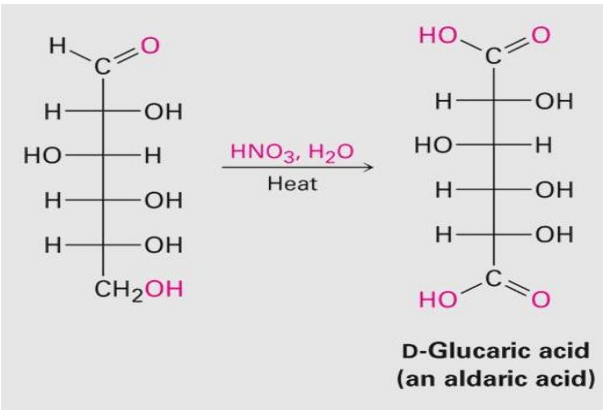
34- Oxidation of Monosaccharides:

- Reaction of Monosaccharides

1- With Mild Oxidizing Agents



2- With Strong Oxidizing Agents



إجتهاد شخصي .
بالتوفيق للجميع.