MON 30 WK 49 (334-031)

Reaction Summary

Frankland: $R-Cl \xrightarrow{Zn} R-R$

Grignard: $R-Cl \xrightarrow{Mg} R-MgCl \rightarrow R-R$

1) Alkane

Fittig – $Ar-Cl \xrightarrow[DE]{Na} Ar^{\cdot} \rightarrow Ar-Ar$

Wurtz-Fittig – $R-Cl + Ar-Cl \xrightarrow[DE/Et_2O]{Na} R-Ar$

Ulmann – $Ph-I \xrightarrow{Cu} Ph-Ph$ (dimer)

Wurtz : $2R-Cl \xrightarrow[DE]{Na} 2R^{\cdot} \rightarrow R-R$

3° X Kolbe : $RCOOK \xrightarrow{+} RCOO^{\cdot} \xrightarrow{-CO_2} R^{\cdot} \rightarrow R-R$ (Anode)

Metal Reduction : $R-Cl \xrightarrow[H_2]{Zn-HCl} R-H$ (Metal + Acid/Base)

Correy House : $R_2CuLi \xrightarrow{R-Cl} R-R$

Sodalime : $R-COOH \xrightarrow[CaO]{NaOH} RCOO^{-} \rightarrow R^{-} \rightarrow R-H$

Hydrogenation : $\xrightarrow[D_2/H_2]{Ni/Pd/Pt}$ (syn)

$Ph-NO_2 \xrightarrow[OH^-]{Sn/HCl} Ph-NH_2$

($RCOOH, RCONH_2, RCOOR \rightarrow LiAlH_4$)

Addition

1) Anti Addition — Br_2/CCl_4, Br_2/H_2O

PAA / H_2O (Peroxy-Acetic Acid) → Threo / Erythro

2) Syn Addition — dil. $KMnO_4$ / OsO_4 (Cis: Erythro; Trans: Threo)

Rosenmund: $Ni/Pd-BaSO_4$ [$R-COCl \rightarrow R-CHO$]

Na/NH_3 or Li/NH_3 → Birch Red. (Anti)

For Fischer stereo-specific

$HBO / B_2H_6 + H_2O_2$ → $CH_3-CH(OH)-CH_3$

3) Both Addition

$Cl_2/Br_2 + h\nu$

NBS (α) post.

$HBr + R_2O_2$ → CH_3-CH_2-Br (Also $(C_6H_5CO)_2O_2$)

Radical

2° → direct chiral

3° indirect chiral

distillation = Total – enantiomer

MKA

dil. H_2SO_4 ⊕ HBr / CCl_4

OMDM

H_3O^+

Kucherov: $HgSO_4$ = Water Addn

Total Possible – 2 = Opt. Active

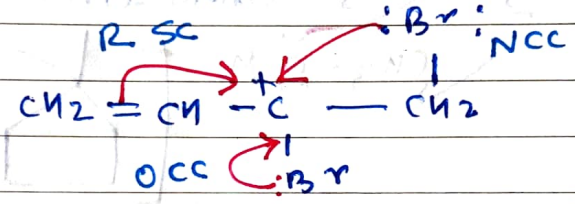
Gem / Meso

CCl_4 + $+H-Br$ $\xrightarrow{R_2O_2}$ Br

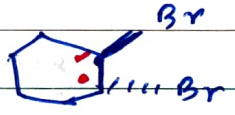
TUE 01 WK 49 (335-030)

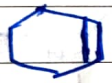
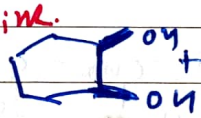
M T W T F S S
30 1
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9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
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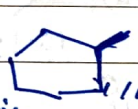
- TCP — Stable Product (α-H ↑) 40°C
  default → 25°C
- KCP — Stable cation (3° > 2° > 1°) −80°C
- H−Br → AMKA ✗ (HCl, H−F X)
- AMKA, MKA same → Sym Alkene, Symm Alkyne, Vinyl Halid
- Cation



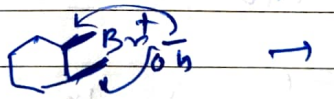
- Note

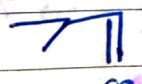
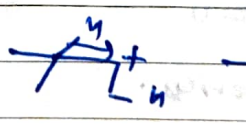
1)  Br_2, CCl_4 →  anti Racemic

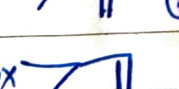
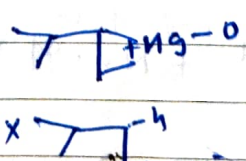
2) Baeyer.  dil KMnO4 (violet/pink.) / OsO_4, $NaHSO_3$ →  NCC, syn

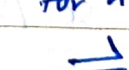
3) Prileschaew  PAA (CH_3CO_3H) or H_3O^+ (MCPBA) →  syn, cis → Racmic, trans − Meso.

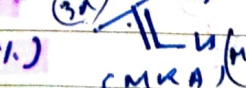
Anhy →  (Red)

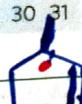
4) Bromine water Hydration  Br_2, H_2O → 

5) Acidic  dil H_2SO_4, H^+/H_3O^+ →  (3°)

6) OMDM  ① Hg(OAc)2/H2O ② NaBH4 →  (2°)

7) HBO (AMKA) ① B_2H_6 ② H_2O_2 / Nu^- → Nu^- = NH_2, Br, OH for H →  (1°)

8) Kucherov  $HgSO_4$ (1%), H_2SO_4 (40%) →  (MKA) (more α) tauto → ② ② ① Total = 8

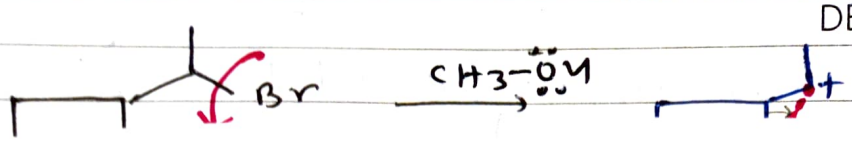
6) Allylic Sub  NBS, CCl_4 →  (R,S) → 

CAT threo
TAE erythro

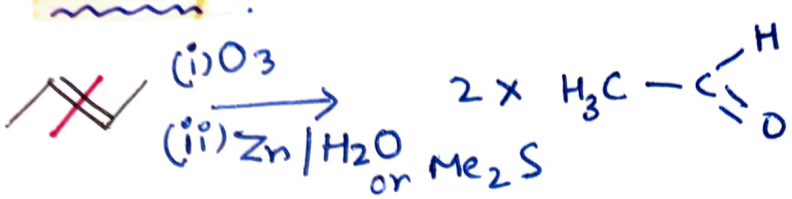
Anhy, NCC

JAN - 2016

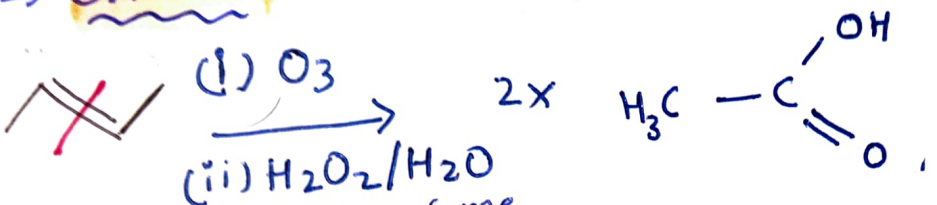
FRI 04 DECEMBER 2015

5) 

1) Reductive. Forms – Aldehyde, Ketone



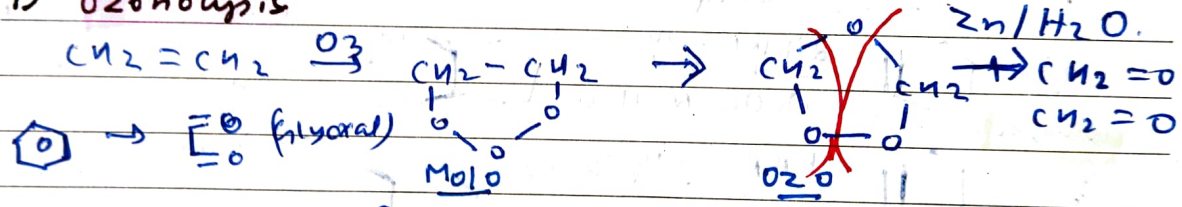
2) Oxidative. Forms – Ketone, Acid

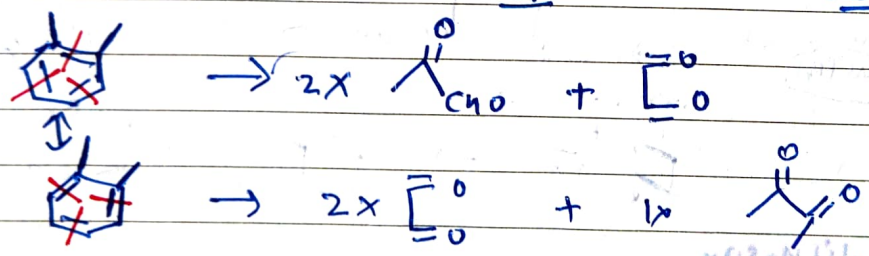


(iii) Δ ← some carboxylic Acid (β-Keto/Maleic) decarboxylate.

SAT 05 WK 49 (339-026)

7) Ozonolysis



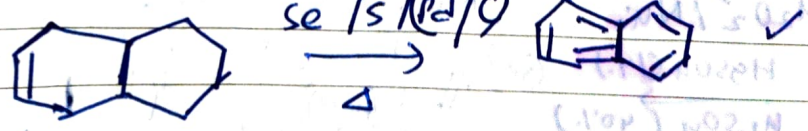


* Hydrogen - Deficiency. (≡ → 2 H_2)

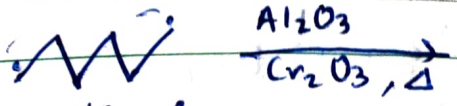
06 SUN

No. of double bond + No. of ring (single) = Mole of H_2

8) Dehydrogenation.



Whereas



Aromatisation

M	T	W	T	F	S	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

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Aromatic

DECEMBER 2015

MON 07 WK 50 (341-024)

* $KBrO_3 + HBr \rightarrow Br_2$ ↑ Bromination

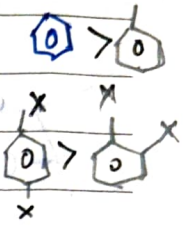
1) Halogenation

$Br_2/FeBr_3$

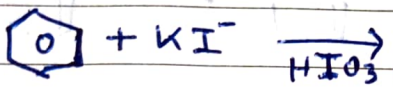
$Cl_2/AlCl_3$ (slow) or $Br_2/FeBr_3$ →  (Δ) σ complex Arenium, Wheland. → ($AlCl_4^-$ fast) → 

other – BCl_3, $FeCl_3$, $AlCl_3$, $SnCl_4$, $ZnCl_2$ $SbCl_5$

- Stability of σ ∝ Rate of Rxn. ∝ +M/+H/+I
- Halogen: Rate – –I > +M
  Direction → +M > –I

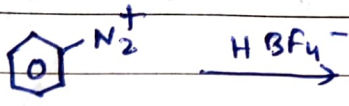


- Iodination

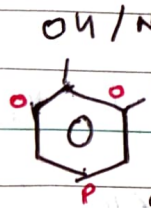


HIO_3 / HgO / HNO_3

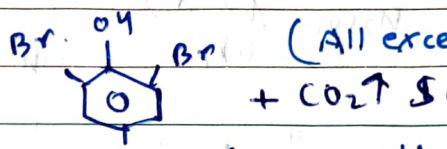
- Fluorination.

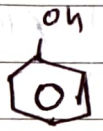


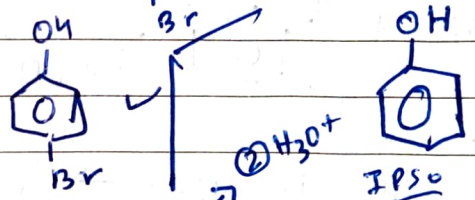
Balz-Schiemann.

- 

(All except meta) No effect

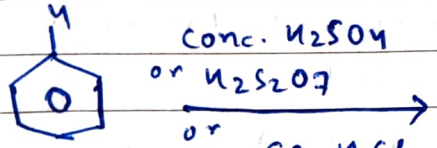


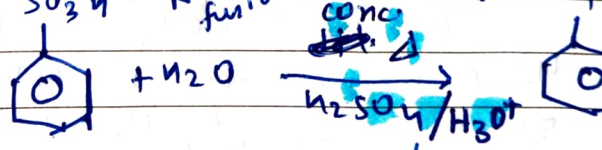
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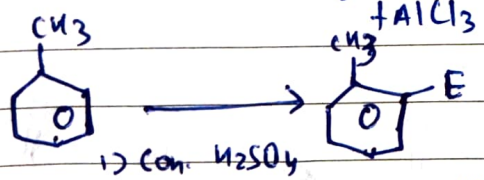


TUE 08 WK 50 (342-023)

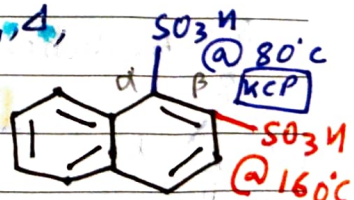
2) Sulphonation

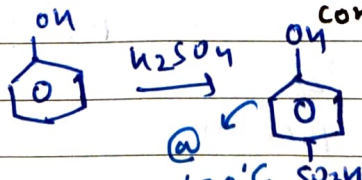






- Naphthalene →





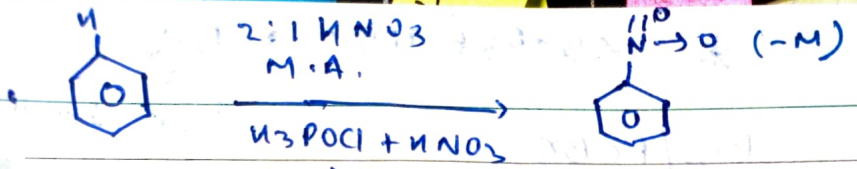
3) Nitration

- $O=\overset{+}{N}=O$ → Nitronium.
- H_2SO_4 → Acid ; → (2 : 1 HNO_3)
- HNO_3 → Base

Polynitro → explosive, TNN, TNT, RDX, TNB

WED
09
WK 50
(343-022)

DECEMBER 2015

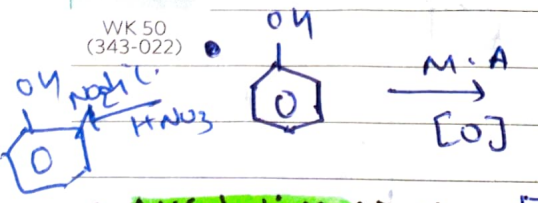


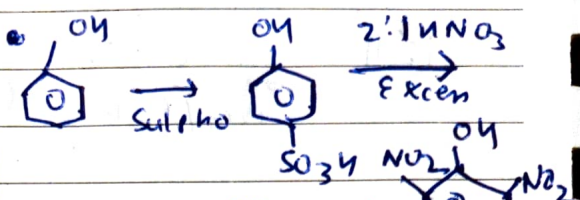
$H_3POCl + HNO_3$

$NO_2^+ BF_4^-$

dil. HNO_3

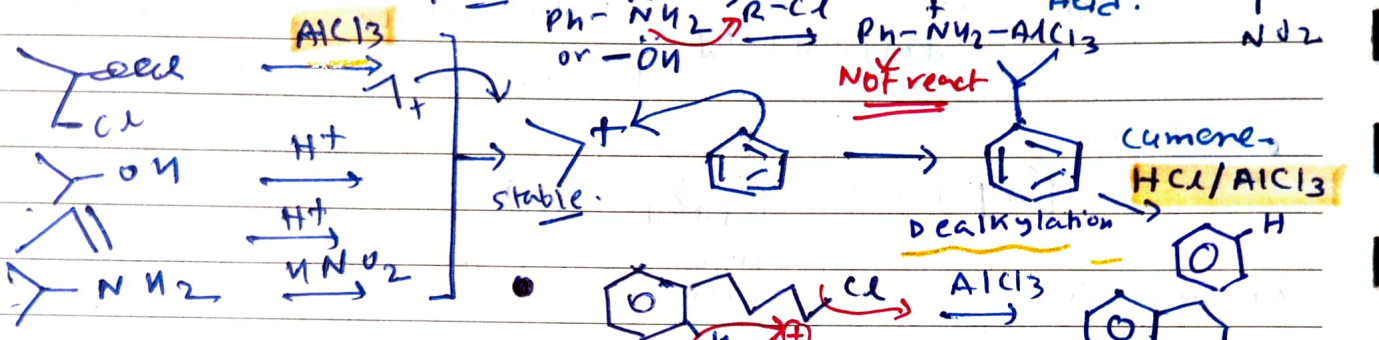
But))

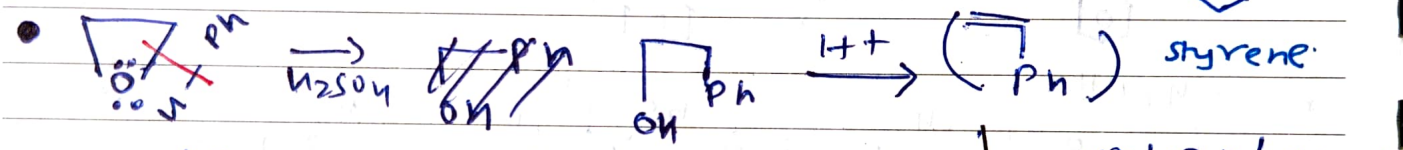




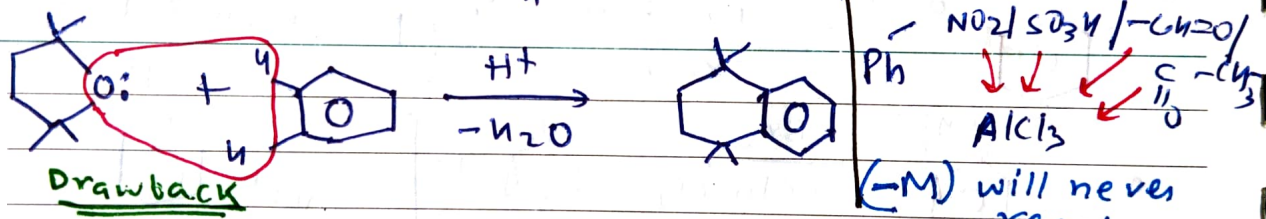
4) **Alkylation** (F.C)

Note



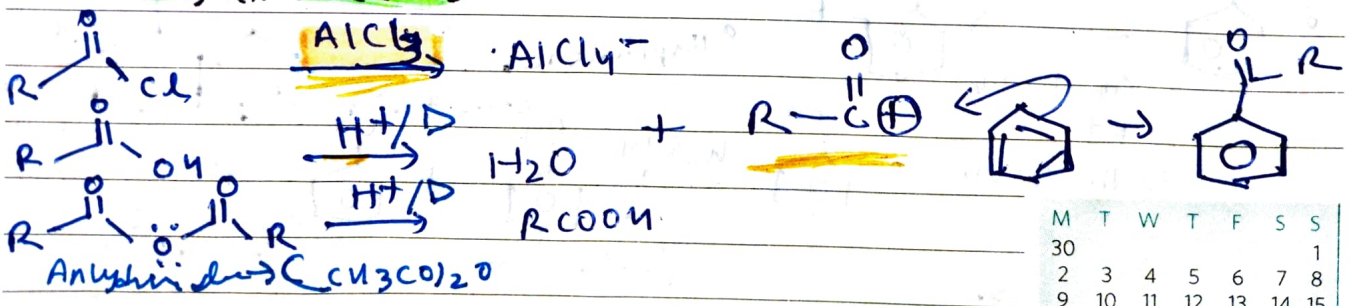


THU
10
WK 50
(344-021)

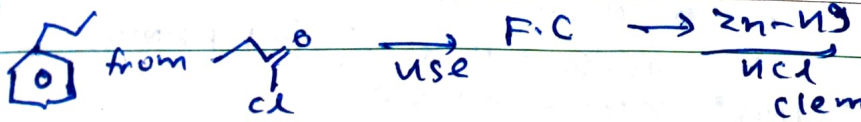


1) Vinyl, Phenyl → X (Strong Bond)
2) (-M) → X (FeCl3 Also)
3) $AlCl_3 > ZnCl_2$ use to prevent Rearrg.
4) Reactant excess → polyalkylation.
5) Isomer → CH_3-Cl / $AlCl_3$ (O, P) → m

5) **Acylation** (F.C)



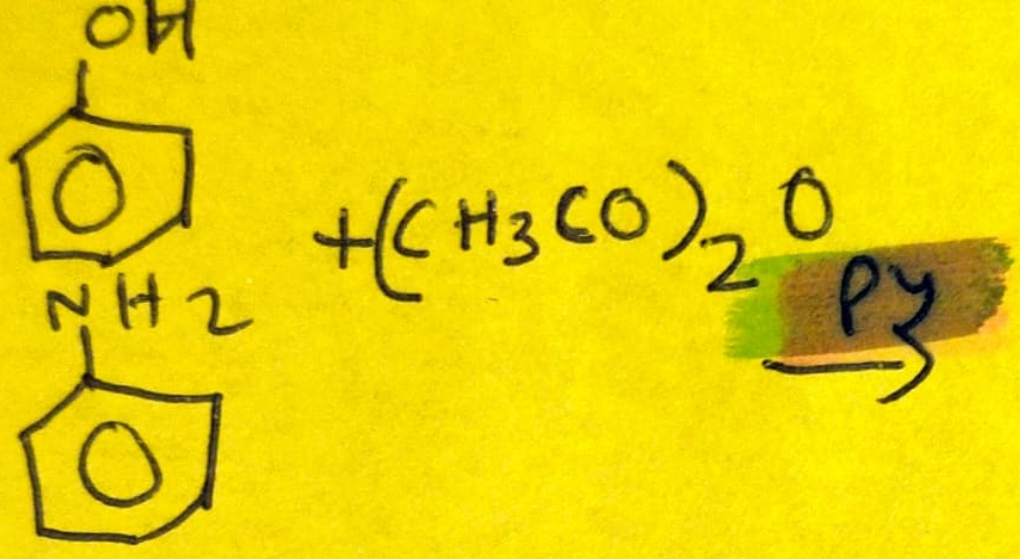
For linear chain.



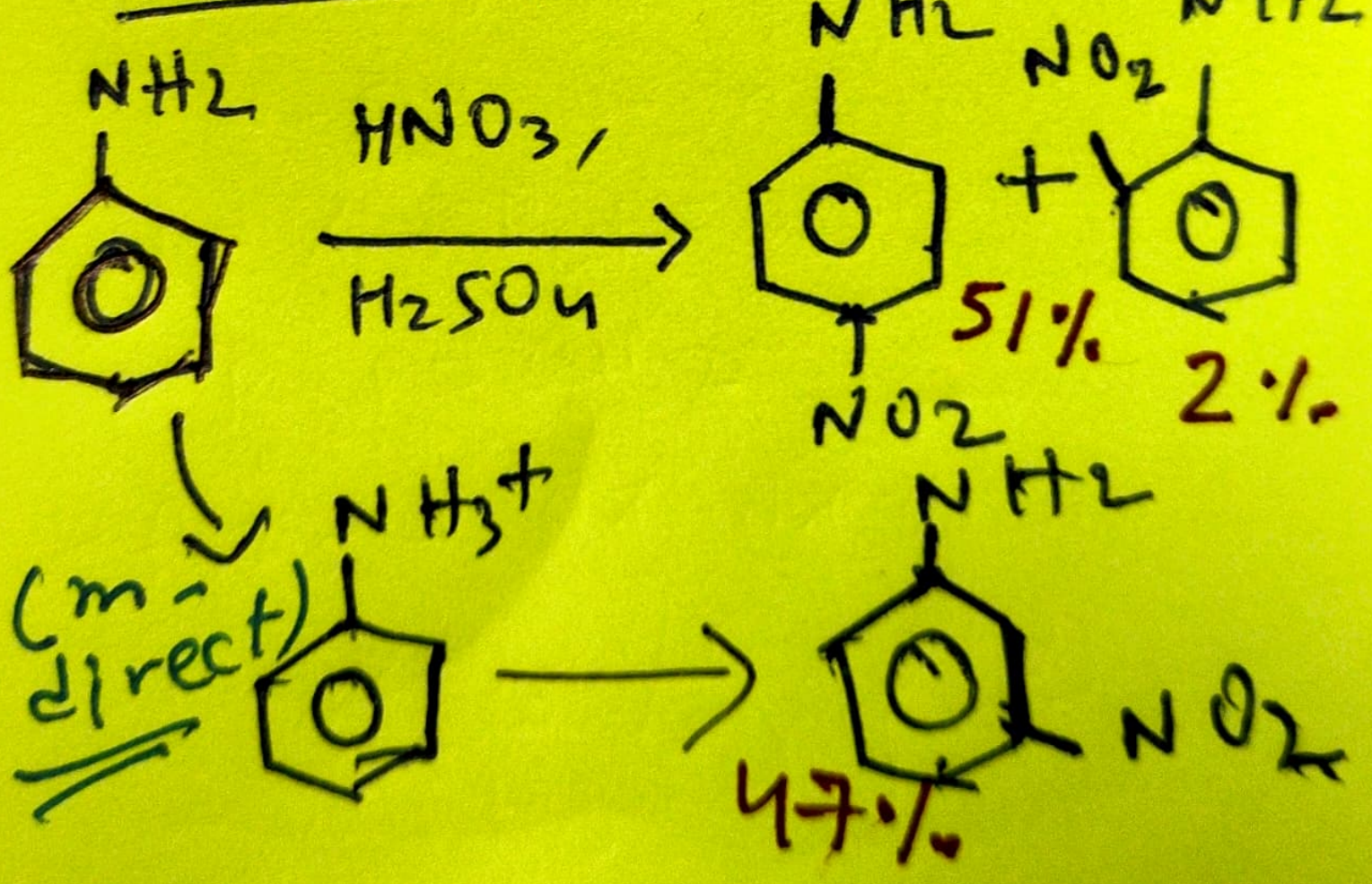
M	T	W	T	F	S	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

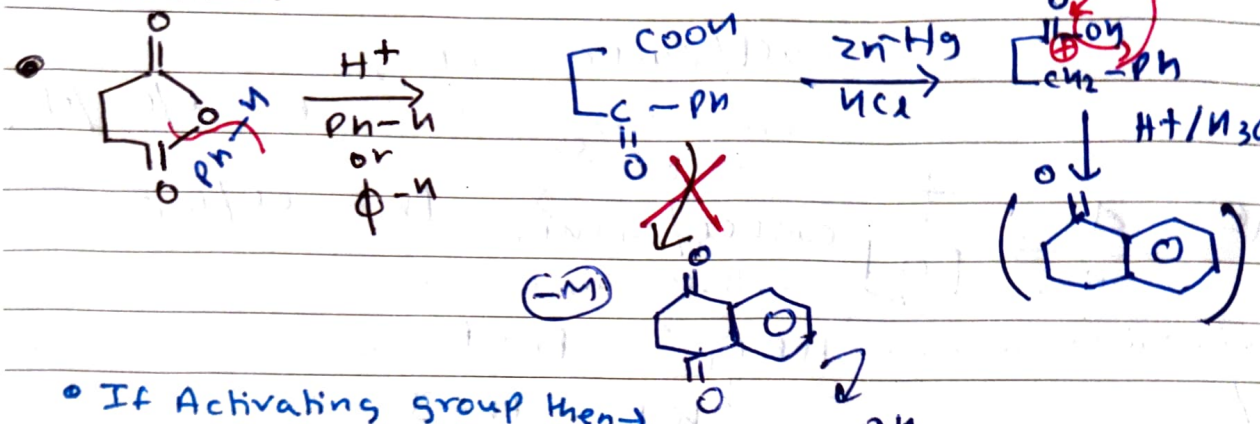
NOV - 2015

For Acylation in Phenol, Aniline do not use $AlCl_3$.

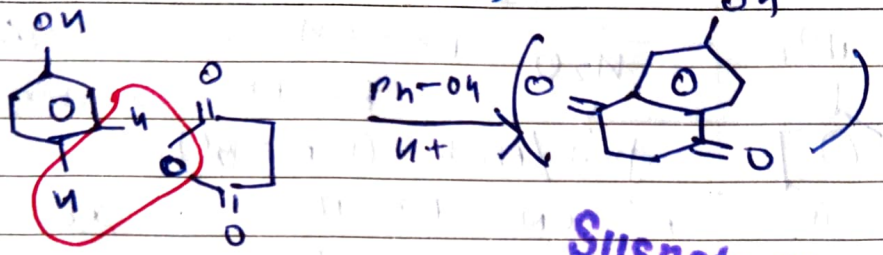


VVImp ★★★



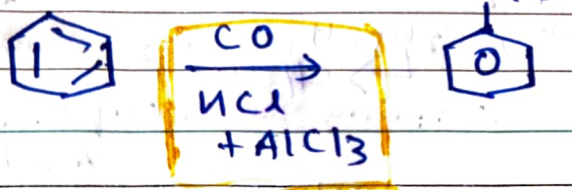


• If Activating group then →



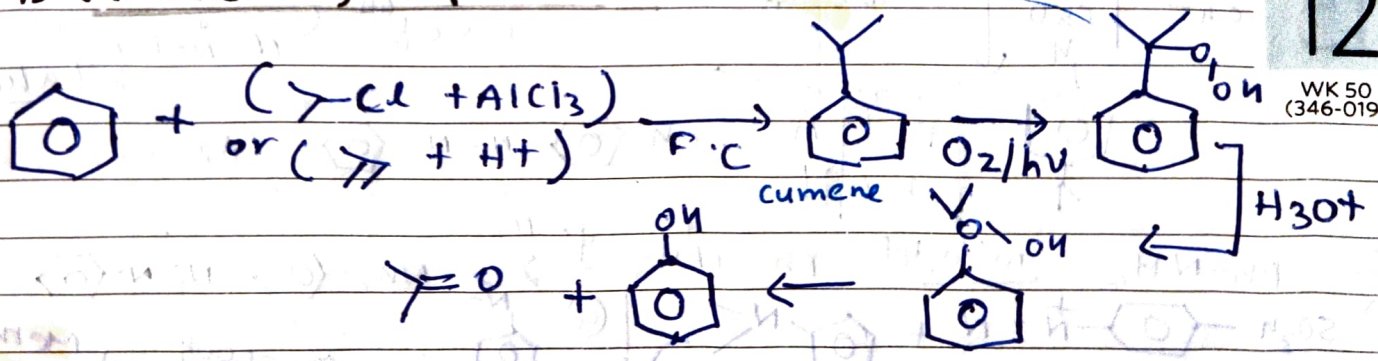
Susnata Chattopadhyay

6) Gattermann Koch Rxn

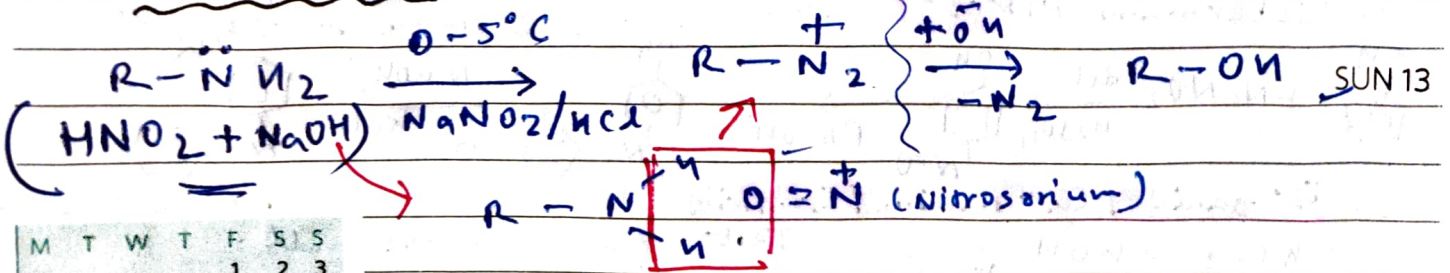


Benzaldehyde.

7) Cumene - Hydroperoxide



8) Diazotization



Note :-

- যদি 5°C ↑ (N_2)↑ ⇒ Aromatic 2(a)
- যদি 5°C ↓ (N_2)↑ ⇒ Aliphatic 2(a)

SUN 13

very Imp

MON 14 WK 51 (348-017)

DECEMBER 2015

$NO_2^+ S^-$ $Ph-S^{\ominus} \rightarrow Ph-S-Ph$

$CuCl / Cu_2Br_2 / Cu^+ NO_2^-$

Sandmeyer, copper salt → $Ph-Cl/Br/NO_2$

$Ph-N\equiv N^+ Cl^{\ominus}$ $\xrightarrow[-N_2]{\Delta}$ Diazonium chloride.

$Cu + HCl / Cu + HBr$ → $Ph-Cl/Br$ Gatterman, Cu-metal

HBF_4^- → $Ph-F$ Balz-Scheimann

$NaNO_2/HCl$ ($T=5°C$)

NH_2 ← $3Sn/HCl$ / Fe/HCl / Aniline/Zn/CH_3COOH ← NO_2

$\xrightarrow{KI}$ $Ph-I$

$\xrightarrow{H_2O}$ $Ph-OH$ Hydrolysis.

$Ph-Ph$ Gomberg-Bachmann

$\phi-H / Ph-H$ (Biphenyl)

$AgCN$ → $Ph-N\equiv C$ isonitrile

$CuCN/KCN$ → $Ph-C\equiv N$ · cyanide.

H_3PO_2 / $HCOOH$, C_2H_5OH ($\rightarrow CH_3CHO$) $+\Delta \rightarrow H^- \rightarrow Ph-H$ Hydrogenation.

Carboxylation

CH_3 / OH / CO → COOH

Hot $KMnO_4$ (Alk.) or $K_2Cr_2O_7$ / OH^-

Sodalime / Soda-lime / Decarbo

H^+H^+	OH^-
B P	A
R O	Y

TUE 15 WK 51

→ slightly basic to extract acidic

(a) Coupling Reaction / Diazo / Azodye.

① $Ph-OH$ → (dil NaOH, $T=5°C$, OH^-) → $Ph-O^-$ → $N\equiv N-Ph$ → Para

$OH-C_6H_4-N=N-C_6H_5$ (Azodye) Orange.

② $Ph-NH_2$ → (mild, H^+) → $Ph-NH_3^+$ → ($\phi-N_2^+$) → $NH_2-C_6H_4-N=N-C_6H_5$ Yellow

③ $SO_3H-C_6H_4-N^+\equiv N$ + C_6H_5-N → Methyl orange

④ $COOH-C_6H_4-N=N-C_6H_5$ → Methyl RED

(b) Liebermann-Nitroso For Phenol / 2° Amine with $-NO$

$OH-C_6H_5$ + $NaNO_2$ (dil H_2SO_4) → $OH-C_6H_4-N=O$ → $Ph-OH$

$OH-C_6H_4-N=C_6H_4=O$ ($NaOH$ / KOH) → $OK-C_6H_4-N=C_6H_4=O$

(c) Isocyanide / Carbylamine / Isonitrile RED indophenol · Greenish-Blue Test Pungent, unpleasant smell

$CHCl_3 + KOH$ → $:CCl_2$

$R-NH_2$ (1° Amine) + $:CCl_2$ → $R-N\equiv C^- + 2KCl + H_2O$

$R-Cl$ + $AgCN$ → $R-N\equiv C^-$

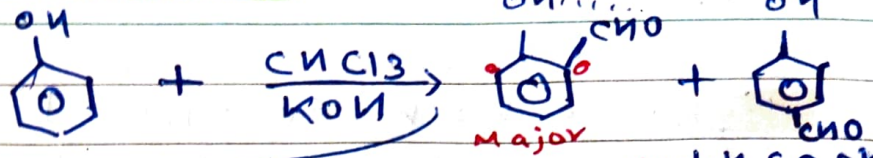
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30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

NOV - 2015

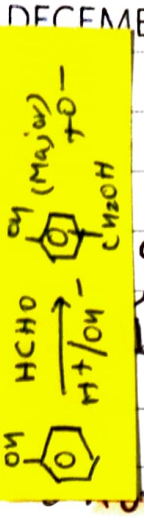
DECEMBER 2015

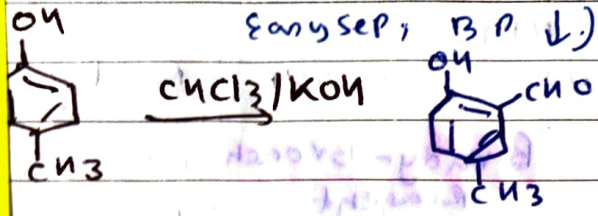
WED 16 WK 51 (350-015)

9) RTR / Reimer Teimann

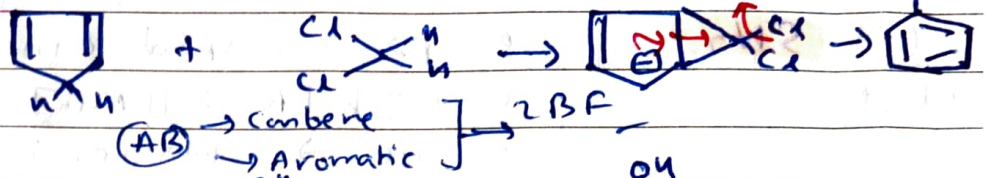


(intra-H-bonding
Easy sep; BP ↓)
Salicylaldehyde.

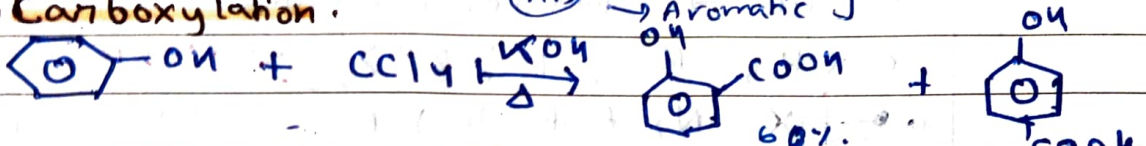




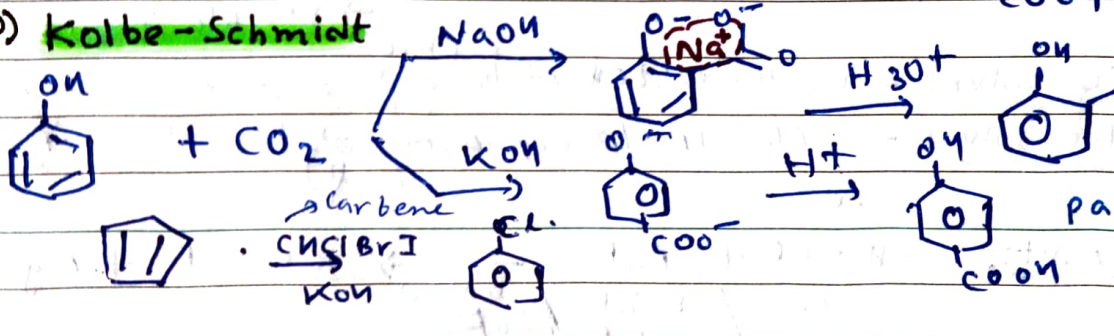
• Abnormal RTR



• Carboxylation.

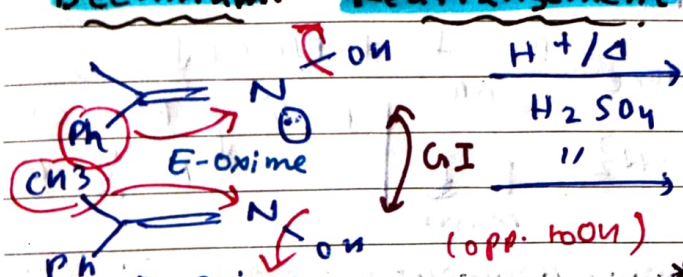


10) Kolbe-Schmidt



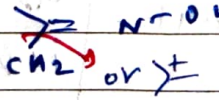
THU 17 WK 51 (351-014)

Beckmann Rearrangement (B.R)

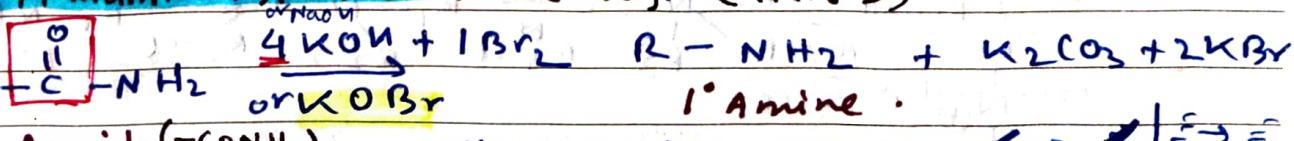


metamers.

• Anti-Migration.

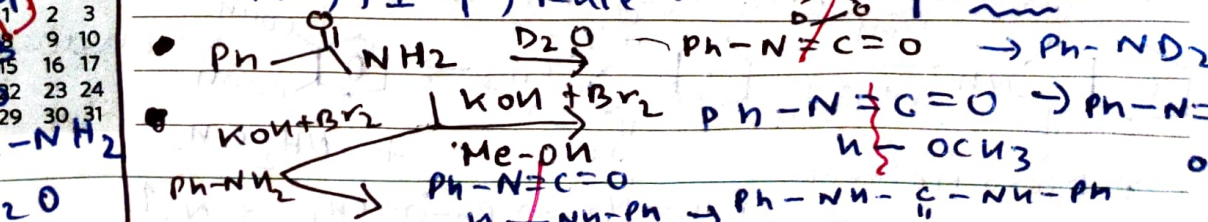
* If  → Ph-CH2+ as stable Cation.

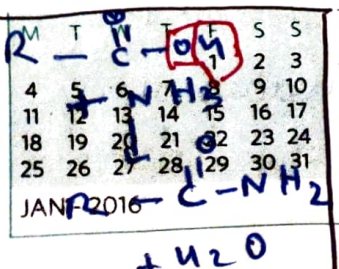
* Hoffmann HypoBromamide Deg. (HHBD)



• Stereochemistry preserve. retention

• +M, +I ↑, Rate ↑





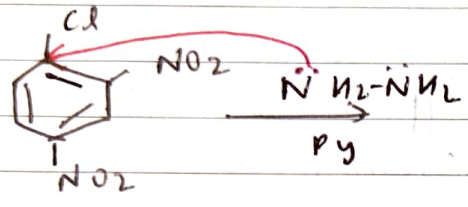
Alkyl Halides

FRI 18 WK 51 (352-013) DECEMBER 2015

(i) SN_2Ar

Rate $Ar-F > -Cl > Br > I$

- Mesenheimer complex
- $r = k[Ar-X][Nu^-]$ 2nd order.
- (1) RDS - slow (2) Regain Arom., Fast
- -F is good L.Gr.



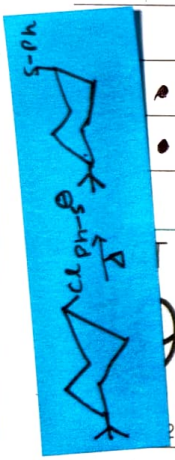
2,4 DNP Brady-Broach Reagent

$R-CHO$, $R-C(=O)-R_1$ → Red, orange & yellow color

(ii) SN_2

- $sp^3 \rightarrow sp^3d$ intermediate.
- $r = k[R-X][Nu^-]$ 2nd order.
- G.C. → Walden inversion
- $CH_3-R > 1^\circ > 2^\circ > 3^\circ$ ← NO SN_2
- SN_2 fast - If → More $\delta+$ charge → stable T.S.
- Protic solvent – (H-bond) ↓ Less H-bond (H_2O) → fast reaction, e.g. $-CH_3$
- Aprotic solvent – (More lp-lp repulsion) ↑ " " & e.g. $-F$

NO SN_2



1) Swartz $CH_3-Cl + AgF \xrightarrow{DMSO} CH_3-F + AgCl$

SbF_3 / Hg_2F_2 / CoF_2

2) Finkelstein $R-Cl + NaI \xrightarrow{Acetone} R-I + NaCl\downarrow$

$R-X \xrightarrow{NaNO_2} R-O-N=O$; $\xrightarrow{AgNO_2} R-NO_2$

3) Williamson-Ether

$R-O^- + \underset{cis}{\text{Cl}} \xrightarrow{SN_2} \underset{trans}{\text{OR}}$

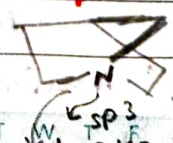
$R-O^- + R'-Cl \rightarrow R-O-R'$

4) Hoffmann-Ammonolysis → 1°/2°/3°/4° Amines

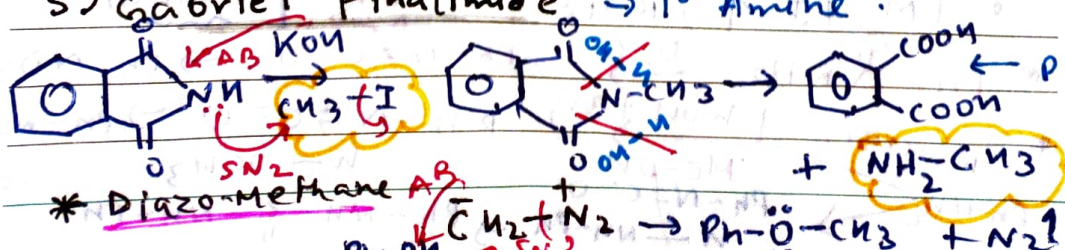
$NH_3 + R_1-Cl \xrightarrow{Py} R_1-\overset{+}{N}H_3 \xrightarrow{Py} R_1-NH_2$ (1°)

$R_1-NH_2 \xrightarrow{R_2-Cl} R_1-\underset{R_2}{\overset{|}{N}}-H$ (2°) $\xrightarrow{R_3-Cl} R_1-\underset{R_2}{\overset{|}{\underset{R_3}{\overset{|}{N}}}}$ (3°) $\xrightarrow{R_4-Cl} R_2-\overset{R_1}{\underset{R_3}{\overset{|}{\underset{|}{\overset{+}{N}}}}}-R_4$ (4°)

Note Bridge-head 'N' is sp^3



5) Gabriel Phthalimide → 1° Amine.



* Diazo-Methane $Ph-OH + \bar{C}H_2 + N_2 \xrightarrow{SN_2} Ph-O-CH_3 + N_2\uparrow$

NOV - 2015

M	T	W	T	F	S	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

No Rxn with iii) Ph–Cl Phenol

↳ 4MCTS

SNi

DECEMBER 2015 ⓓ Darzen

MON 21 WK 52 (355-010)



Acid $R-C(=O)-O-H$

Ester $R-C(=O)-O-R$

$\xrightarrow{SOCl_2}$ $R-C(=O)-Cl + SO_2 + HCl$

$\xrightarrow[\Delta]{SOCl_2}$ $R-C(=O)-Cl + SO_2 + R-Cl$

(W. bond form due to → Driving Force, [C=O, S=O, P=O] Form → Rxn Fwd.

2) $R-OH \xrightarrow{PCl_5} Cl-R + POCl_3 + HCl$

3) $R-OH \xrightarrow[Py]{} SN_2 + P(OH)_3$

For PBr_3, $SOCl_2$ PCl_5

$+ PBr_3 \longrightarrow 3Br-R$ TS

T.S = 1 + Int.

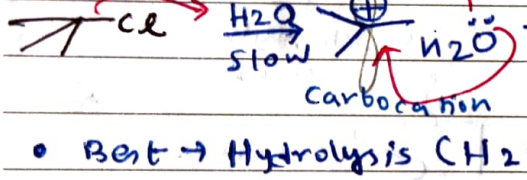
C–O → C–Cl : S. Bond

C=O → C(–Cl)(–Cl)–O

$-C(=O)-O- \rightarrow -C(=O)-Cl$

$-C(=O)-NH_2 \xrightarrow{Py} R-C(Cl)(Cl)-NH_2 \rightarrow R-C\equiv N$ ← $-2HCl$

(iv) SN_1



- Best → Hydrolysis (H_2O)
- Worst → Acetolysis (MeCOOH)
- For 100% Racemisation
  - Super L.G → N_2 / CO_2.
  - Charge Dispersed (+M groups)

* Perfect Racemisation (Solvalised Ion Pair) → 50% R, 50% S

* Partial Racemisation → 60% S

↳ R.Mix – Solvalised. 80%, 40% S

↳ Inversion. (Tight Ion Pair) 20%.

- Stable Cation → RDS slow → Good Rate
- 3° > 2° > 1° cannot form(+) at 25°C
- More α-H → More stable product.

TUE 22 WK 52 (356-009)

1) Lucas Reagent / Groove Process ($HCl + ZnCl_2$)

1° ROH → Heat

2° ROH → 5 min

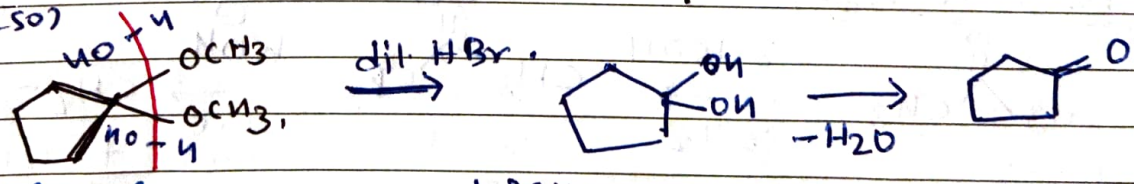
3° ROH → Immediate

→ R–Cl White ppt

Carbenium $\oplus CH_3$

Carbonium $\oplus CH_5$

(+ Reso)



Acetal

(Geminal Diether)

$+ 2CH_3OH$.

Note

Methyl, 1° R–X → SN_1

3° → → only SN_1

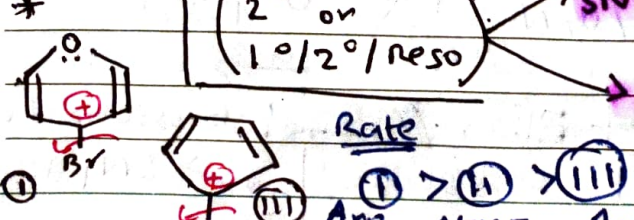
(2° or 1°/2°/Reso → SN_2 $I^\ominus$/SH/N_3/RCOO/CN

Solvent DMSO/ /Py.

→ SN_1 solvent H_2O/Et–OH/ → OH

tBu–OH

Rate



M T W T F S S
1 2 3
4 5 6 7 8 9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30 31
JAN - 2016

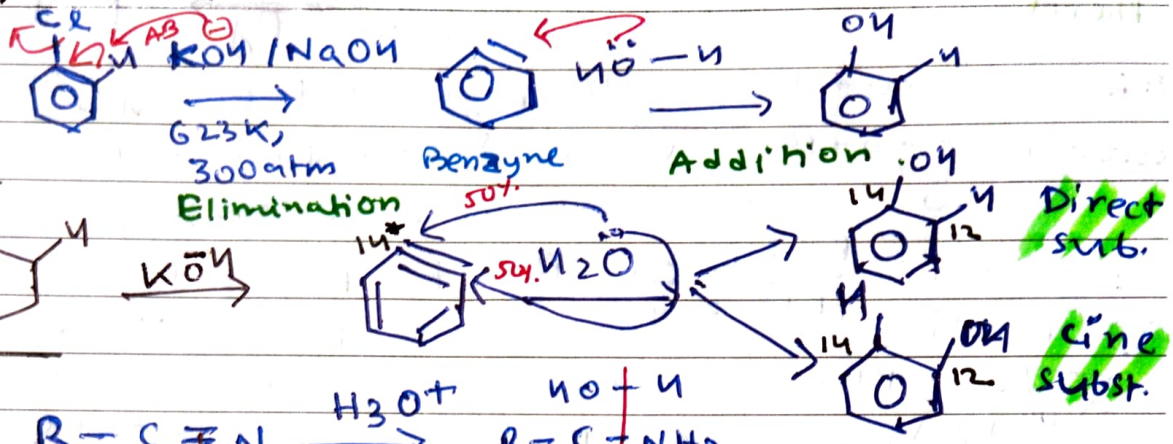
(V) SNEA (Benzyne)



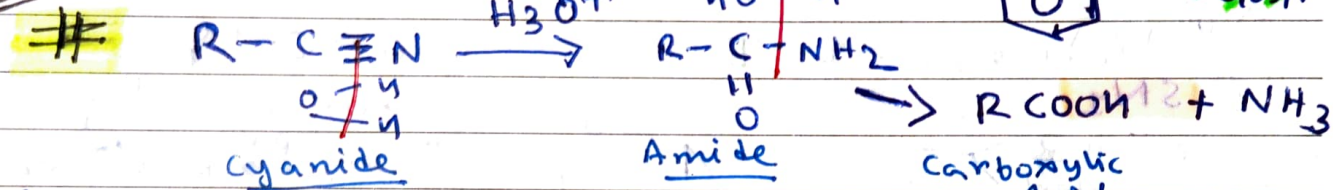
SN_1, SN_2, SN_2Ar, SN_i

WED 23 WK 52 (357-008) DECEMBER 2015

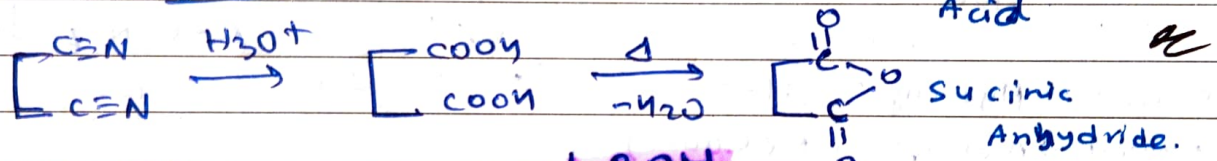
(1) Dow's Process



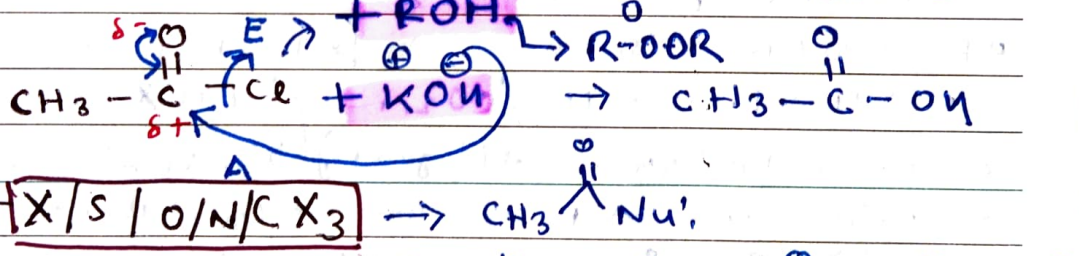
Misc



Eg

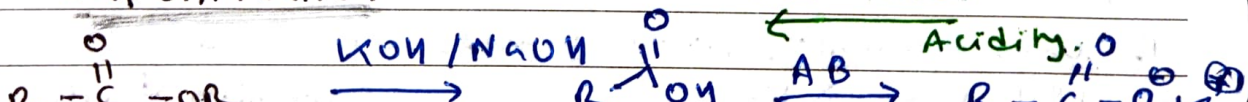


(VI) SNAE



THU 24 WK 52 (358-007)

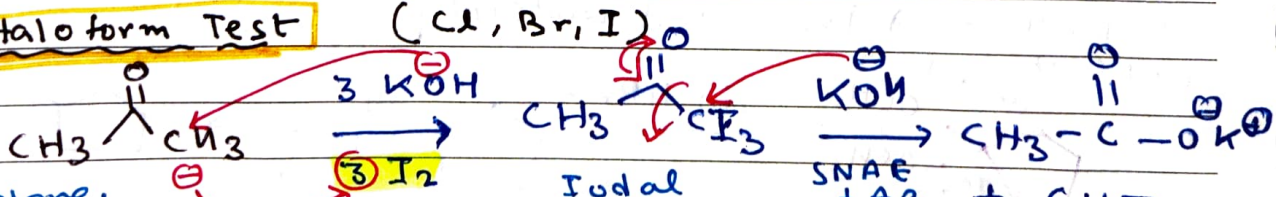
- Saponification



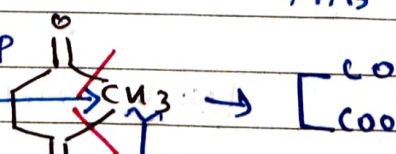
Ester / oil / fat

- Grignard Reagent:

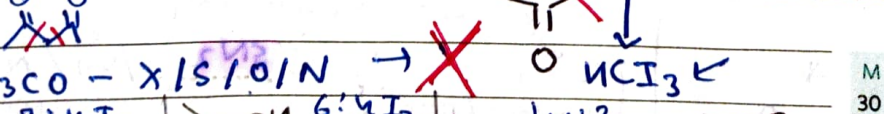
- Haloform Test (Cl, Br, I)



- All α-methyl keto group



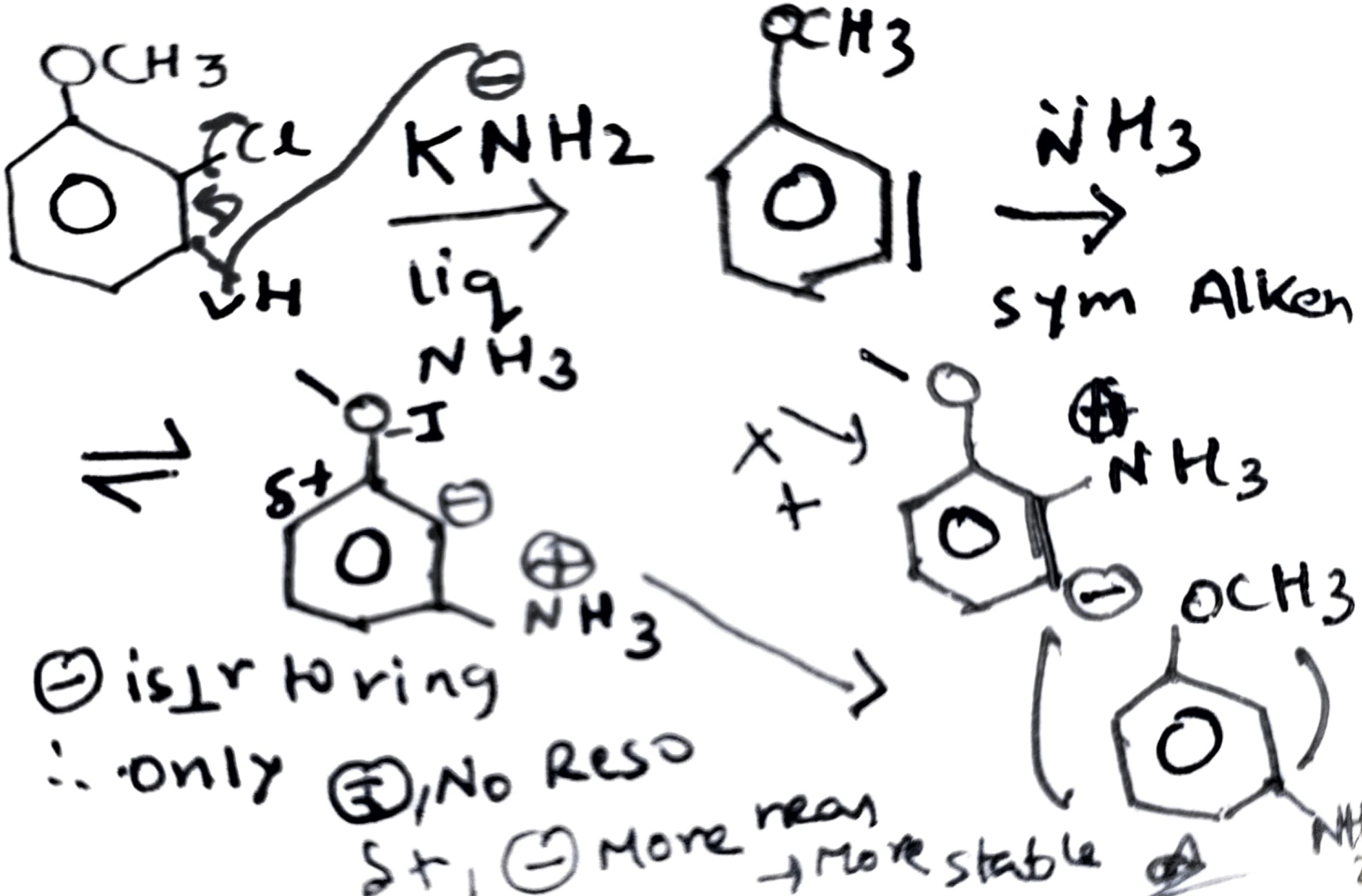
- Active Methylene:



* Hydrolysis of Ether / Alcohol (Basic → No Reaction)

1° → SN_2 conc/dil (Less steric)	2° → SN_1 dil. HI [H_2O]
3° → SN_1 (More steric)	→ SN_2 conc. HI [$I^\ominus$]

M T W T F S S
30 1
2 3 4 5 6 7 8
9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
NOV 2015


OCH3
Cl
H
KNH2
liq NH3
OCH3
NH3
sym Alken
NH3
I
δ+
NH3
⊖ is Ir to ring
∴ only I, No Reso
δ+, ⊖ More reso → More stable
OCH3
NH2

DECEMBER 2015 FRI 25 WK 52 (359-006)

SAT 26 WK 52 (360-005)

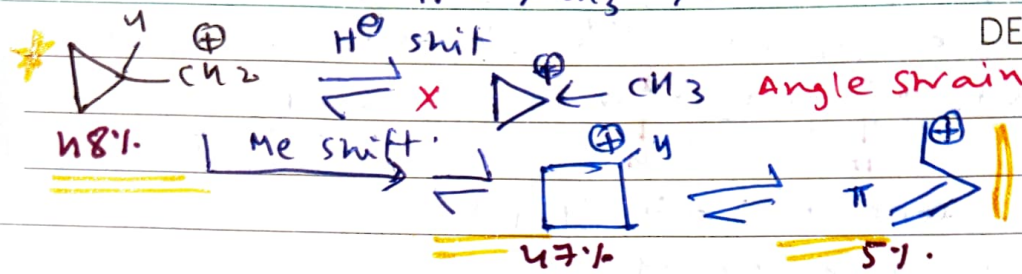
SUN 27

JAN - 2016

Alcohol / Phenols / Ether

MON 28 WK 01 (362-003) — DECEMBER 2015

- Cation - Reat.
- 3C - 2e⁻ T.S.
- $H^{\ominus} > CH_3^{\ominus} > Ph$ shift Rate.

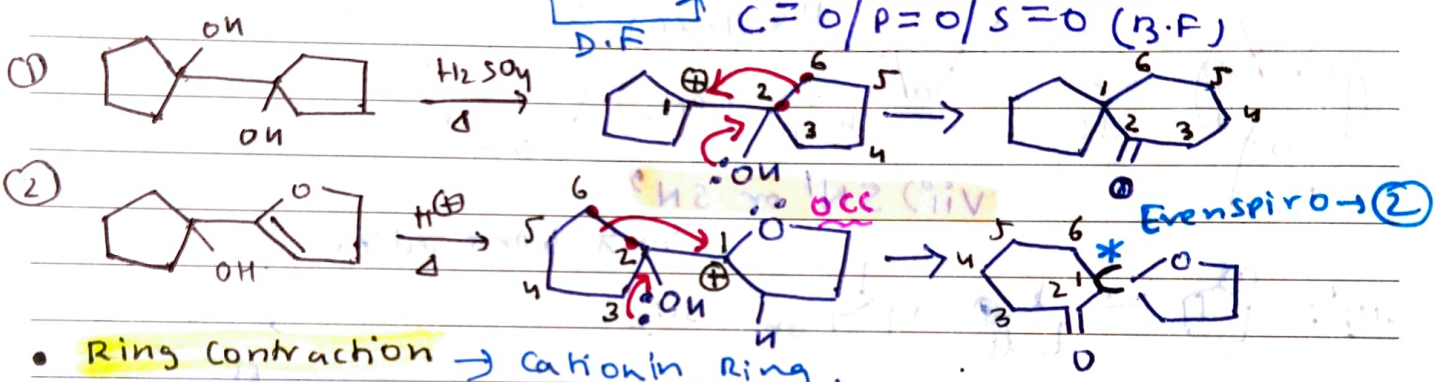


- **Ring Expansion** → cation is out of Carbon Ring.

3 → 4 → 5 → 6 ✗→ 7

D.F

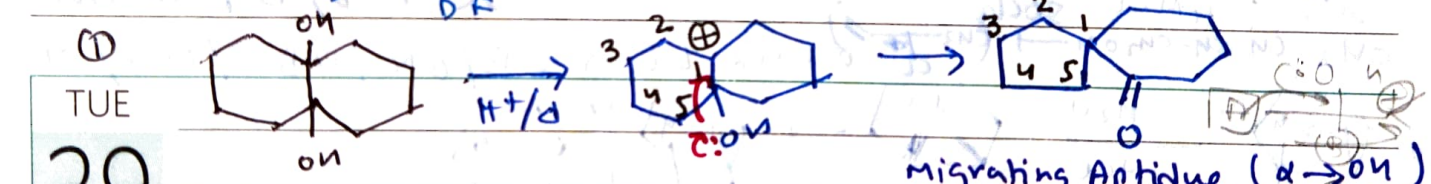
C=O / P=O / S=O (B.F)



- **Ring Contraction** → Cation in Ring.

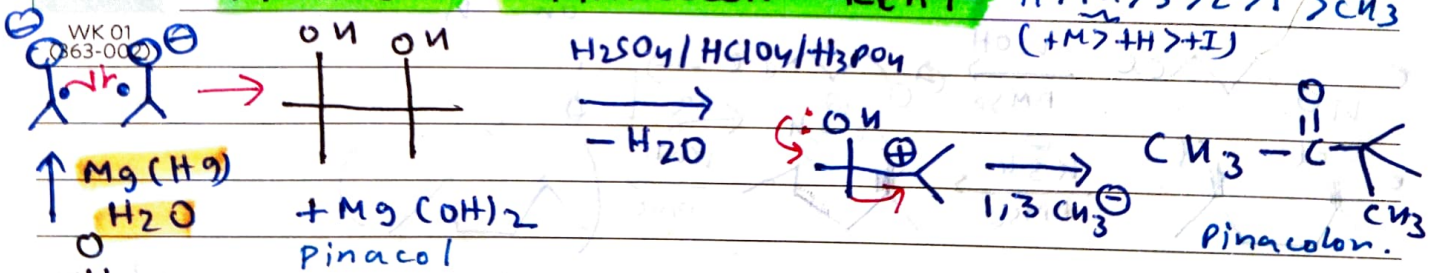
7 → 6 ✗→ 5 ✗→ 4 → 3 • C^+, α-post. → BB

D.F



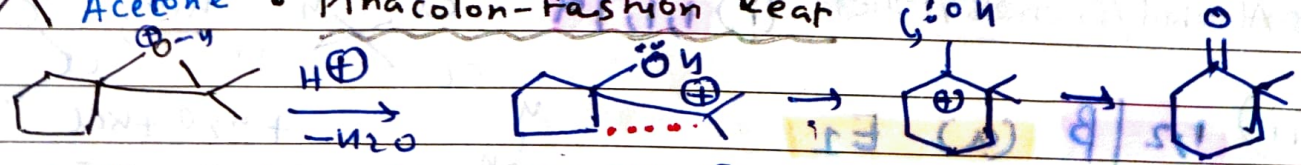
TUE 29 WK 01 (363-003)

- **PINACOLEN - PINACOLON - REAT**
- H > Ph > 3° > 2° > 1° > CH_3 (+M > +H > +I)

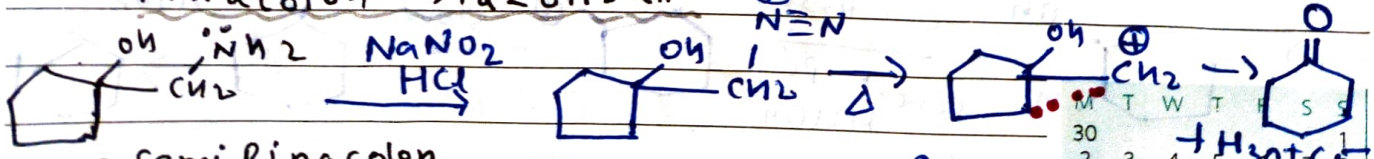


Acetone

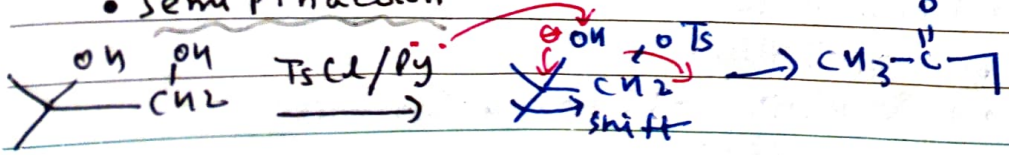
- Pinacolon-Fashion Reat



- Pinacolon Diazotisation



- Semi Pinacolon



NOV - 2015

IMP

$CH_3OH \xrightarrow[\Delta]{H^\oplus} CH_3-O-CH_3$

Glycol $\xrightarrow{H^\oplus/\Delta}$ $CH_3-CH=O$ Acetaldehyde

DECEMBER 2015

WED 30 WK 01 (364-001)

90° H_2SO_4 salt

170° Δ(=)

140° $H^\oplus$

Glycol $\rightarrow$ $CH_2=CH-CHO$ Acraldehyde

H^+/Δ H^+/Δ

4. 5. 6.

a) H^+ $\Delta(E_1)$ If No Reac

Reac:

Total = 6

SN_1 ⇐ Cation ⇒ **E_1**

CH_2 $H^\oplus$ $Cl^\ominus$ $Br^\ominus$ | Moist $Ag_2O/AgOH$

OR $H_2O/CH_3OH/aq$ EtOH/ROH H^+

Racemization ← Open chain T.S ⇒

H_2O/ EtOH/ + Heat

→ conc. H_2SO_4/ H_3PO_4/ $HClO_4$,

SN_2

Polar Aprotic

$I^\ominus/SH/N_3^\ominus/CN^\ominus$, $RCOO^\ominus$

W. Conj. Base

Solvnt – DMSO/DNF/Et_2O, Py.

E_2

Alc KOH, $NaNH_2$, $CH_3CH_2O^\ominus$ + Δ

THU 31 WK 01 (365-000)

(iii) **E_1cB**

alc. KNH_2/KOH

conj. Base

(Cyanohydrine)

E_1cB

• Prolonged treatment/ Deuterium Exchange

$Ph-CH_2-CH_2-Br \xrightarrow{OD^\ominus/D_2O} Ph-C(D)(D)-CH_2-Br \xrightarrow{OD} Ph-C(D)=CH_2$

• Rate ∝ [conj g. Base]

JAN - 2016

(iv) 1,3/γ − E

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(v) E_2 (only in vic)

- No Rearrg. / Cation Shift.
- Anti-Periplanar T.S

L.G & Nu: must be Anti

- Shows isotope Effect (H > D > T)
- 5 MCTs
- Rate 3° > 2° > 1° (Halide)

Alc. $NaNH_2$ / Alc. KOH

① Strong Base ② β-H Acidic ③ Stable Alkene ④ Good L.G ⑤ Anti-Peri. T.S

- Saytzeff Product (More α)
- Regio specific, Regioselective

Q) No. of product?

= ⑤ Product

Q)

F < Cl < Br < I

- Hoffmann > Szf
- Bulky Base

⇒ Steric Crowding.

- Bad L.G

$-NR_3$, $-SR_2$, $-F$

- Hoffmann Exhaustive Elimination.
- α − N − bond Break
- (α − β) π bond Form.

① CH_3-I (excess) ② $AgOH$ ③ Δ

• 3 moles CH_3-I.

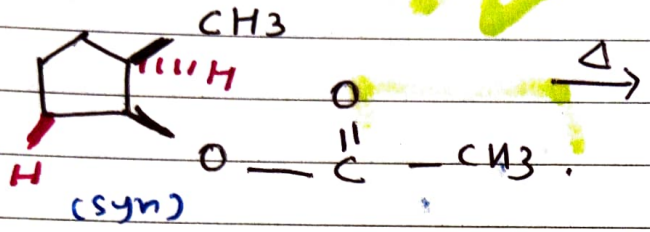
Isoprene → Polymer → Natural Rubber

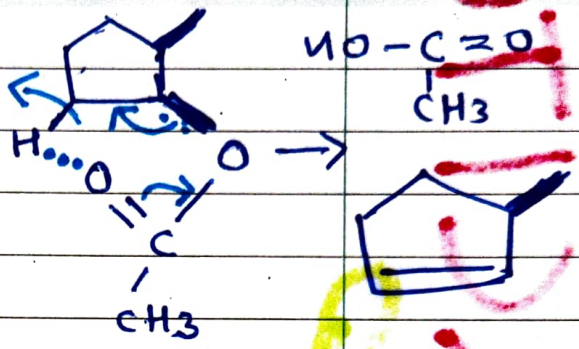
(vi) Ei / Ec ⇒ Pyrolysis. (absence of O_2)

- 6 MCTS. • Rxn on heating.
- Thermal SYN elimination.

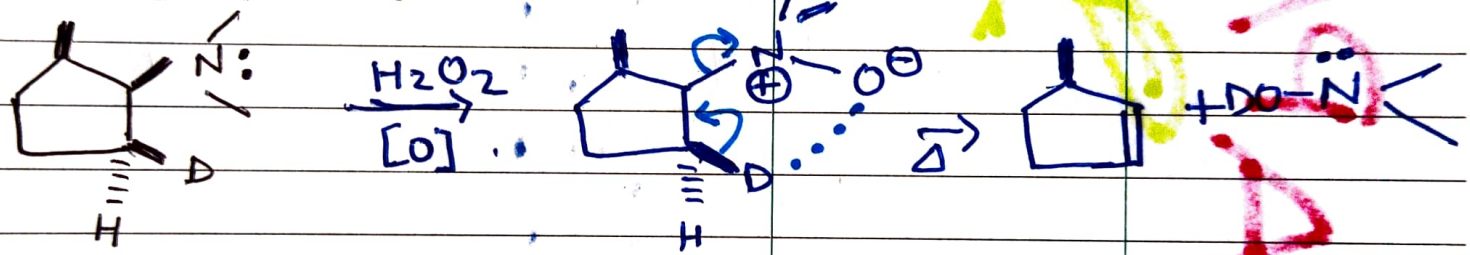
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- **Ester**

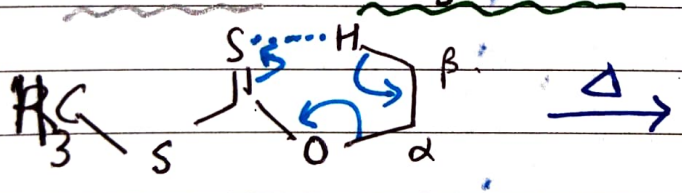


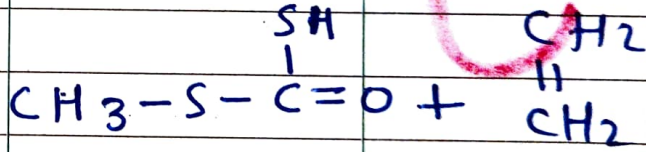


- **N- oxides / Cope Elimination.**



- **Xanthate / Chugaev Rxn.**





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CAPACITOR

BE A

NOT A

BATTERY