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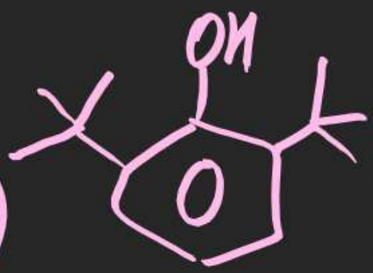
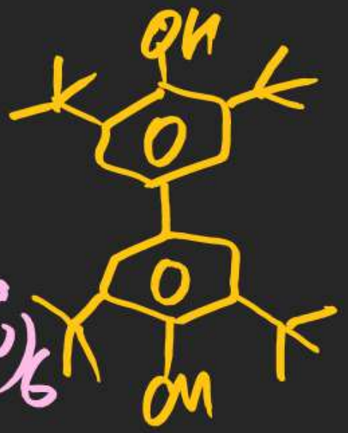
(13) 

(14) 

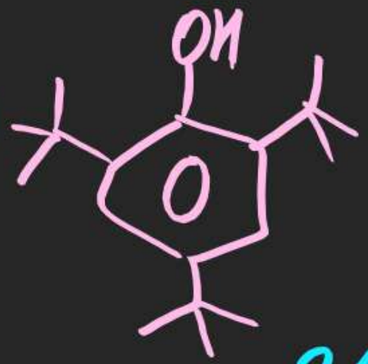
(16) 

(i) NaOH
(ii) $K_3Fe(CN)_6$

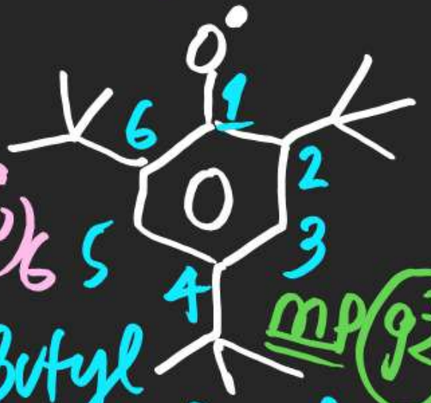


(15) 

(i) NaOH
(ii) $K_3Fe(CN)_6$

(17) 

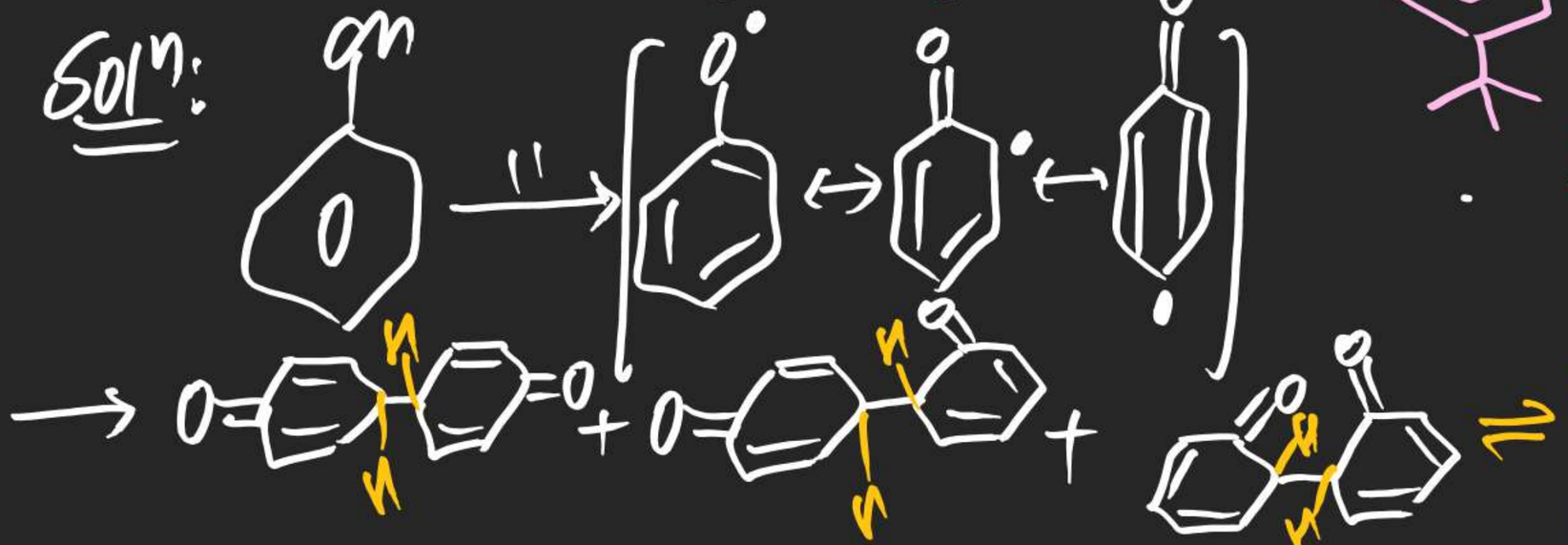
(i) NaOH
(ii) $K_3Fe(CN)_6$



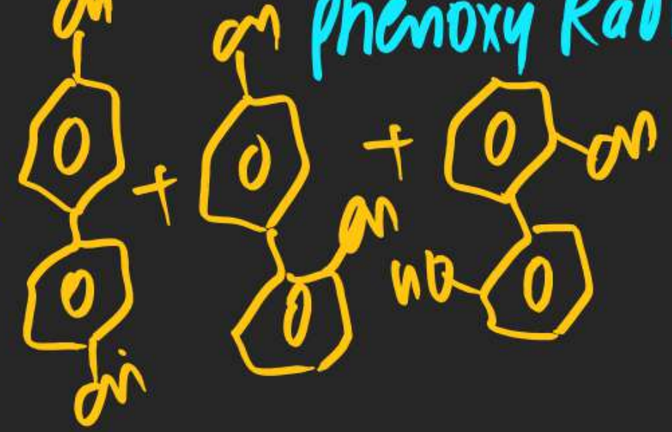
mp (92°)

2,4,6-Tri tert-Butyl phenoxy Radical

Soln:

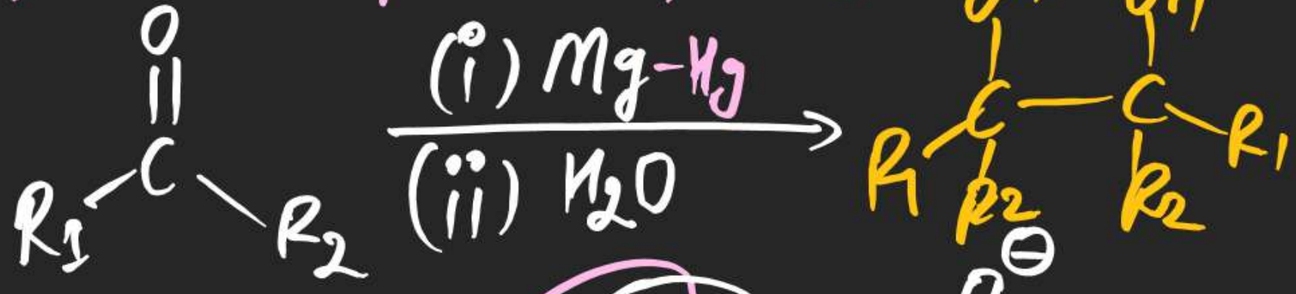


$\rightleftharpoons$



(#) Pinacole formation:- Carbonyl compound on Reduction By Mg-Hg followed By hydrolysis gives vic-diol / Glycol / Pinacole.

(1)



mechⁿ:

Note (i) Anion-Radical intermidiate

(ii) Total No. of pinacole = 3 $[R_1 \neq R_2]$

(iii) Total No. of pinacole = 1 $[R_1 = R_2]$

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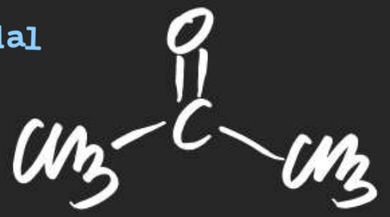
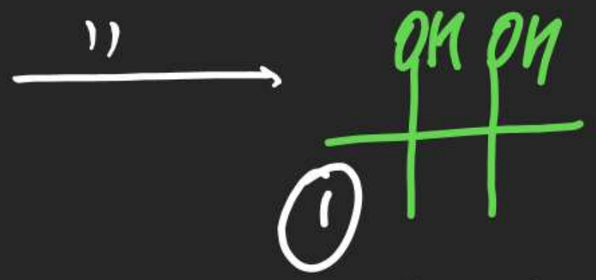
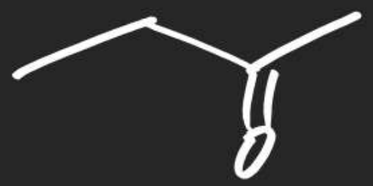
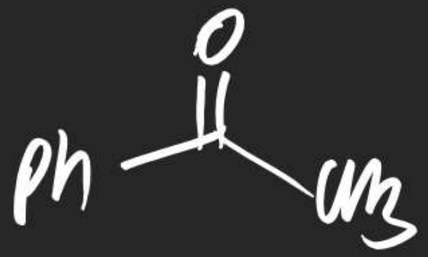
(2) 

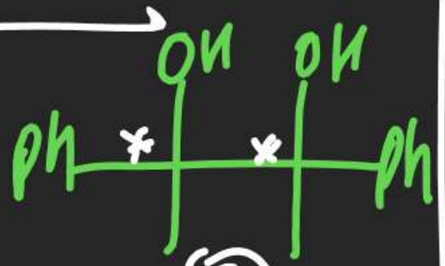


(1)

(3) 

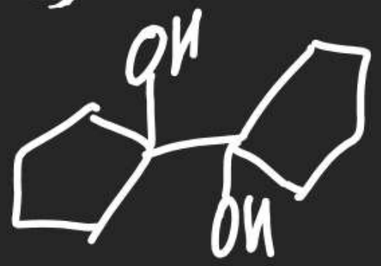
(3)

(4) 

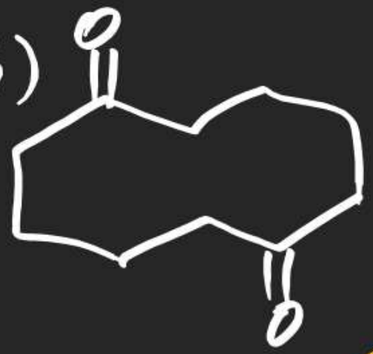


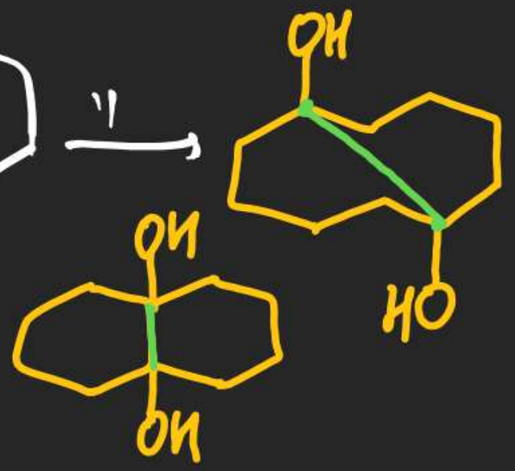
(3)

(5) 



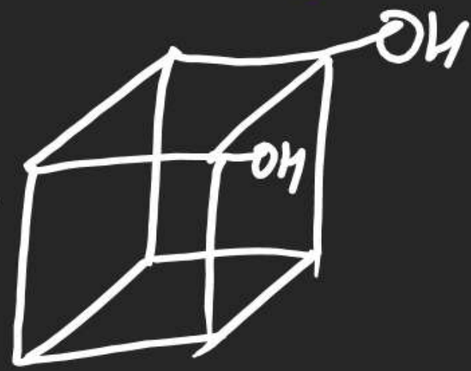
(1)

(6) 



(7) 

(8) 



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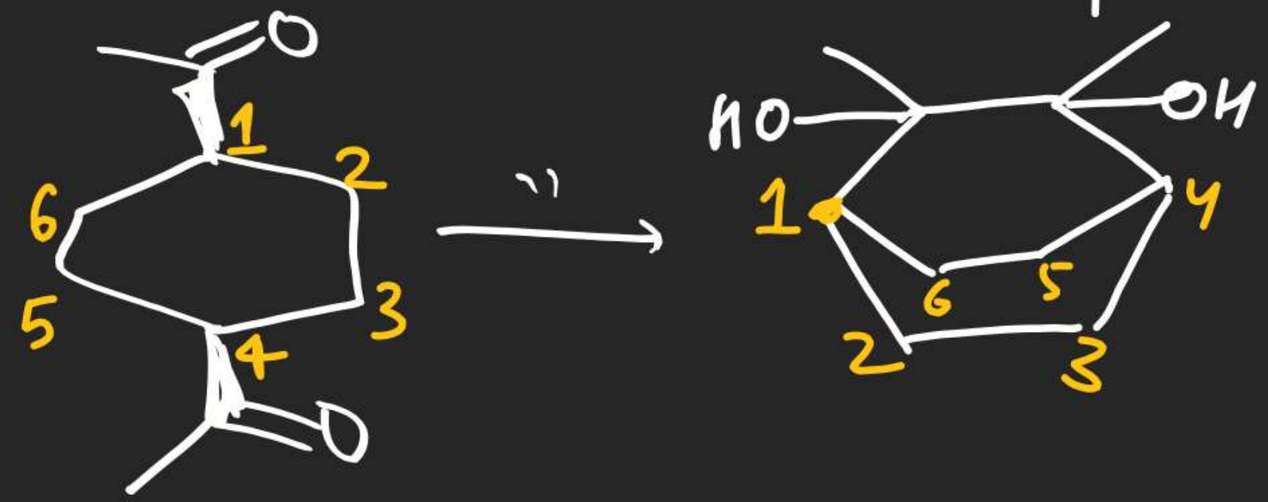
(9)

3

(10)



Acyloin Formation:

In this Rxn Esters gets Reduced By Na-Hg So that α-Hydroxy Carbonyl (Acyloin) is obtained.

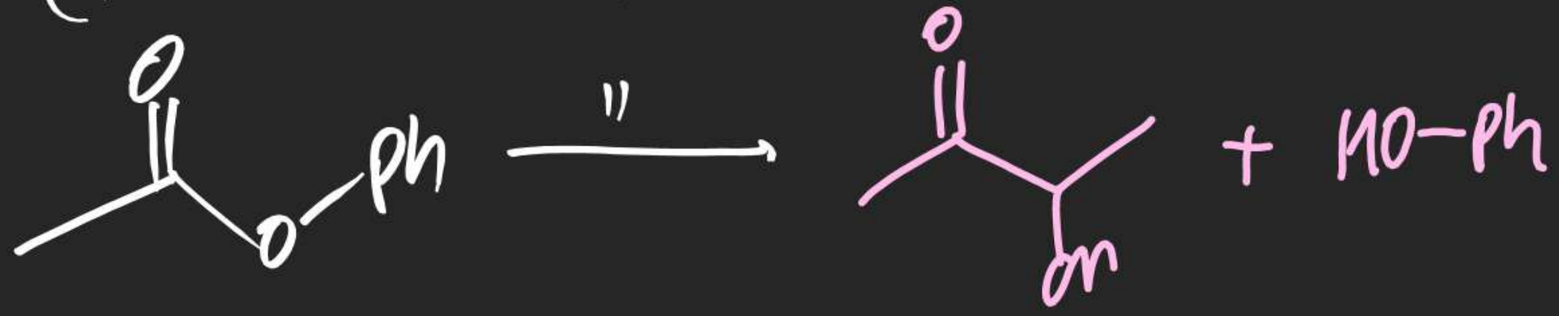
(1) $R_1-C(=O)-OR_2$ (Esters) $\xrightarrow[(ii)\ H_2O]{(i)\ Na\text{-}Hg}$ $R_1-CH(OH)-C(=O)-R_1$ (Acyloin) $+\ R_2-OH$

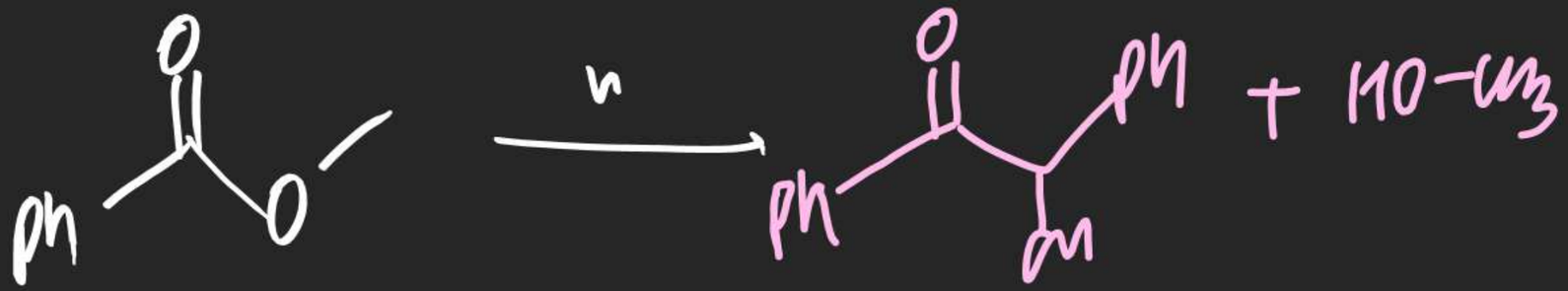
Mechanism:

$2\ R_1-C(=O)-OR_2 \xrightarrow{2\ Na} R_1-C(O^{\ominus})(\cdot)-OR_2 \longrightarrow R_1-C(OR_2)-C(OR_2)-R_1 \longrightarrow$

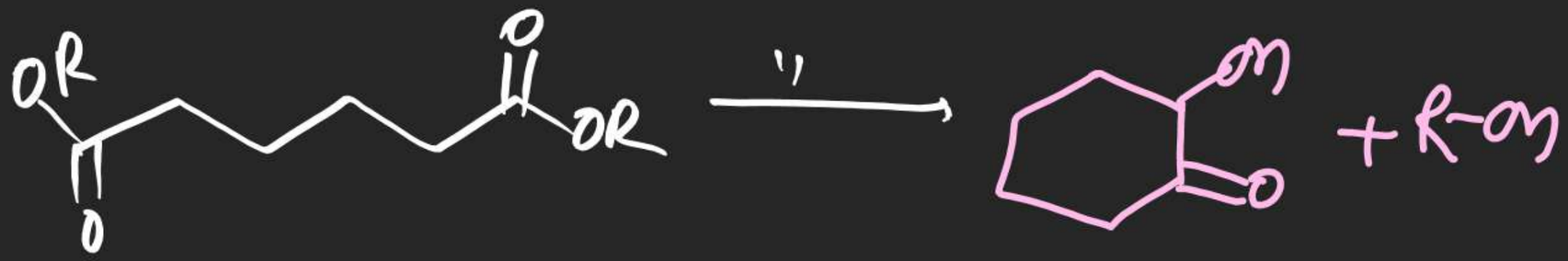
$R_1-C(=O)-C(=O)-R_1 \xrightarrow{Na\text{-}Hg} R_1-C(O^{\ominus}Na^{\oplus})=C(O^{\ominus}Na^{\oplus})-R_1 \xrightarrow{H_2O} R_1-C(OH)=C(OH)-R_1 \rightleftharpoons R_1-CH(OH)-C(=O)-R_1$

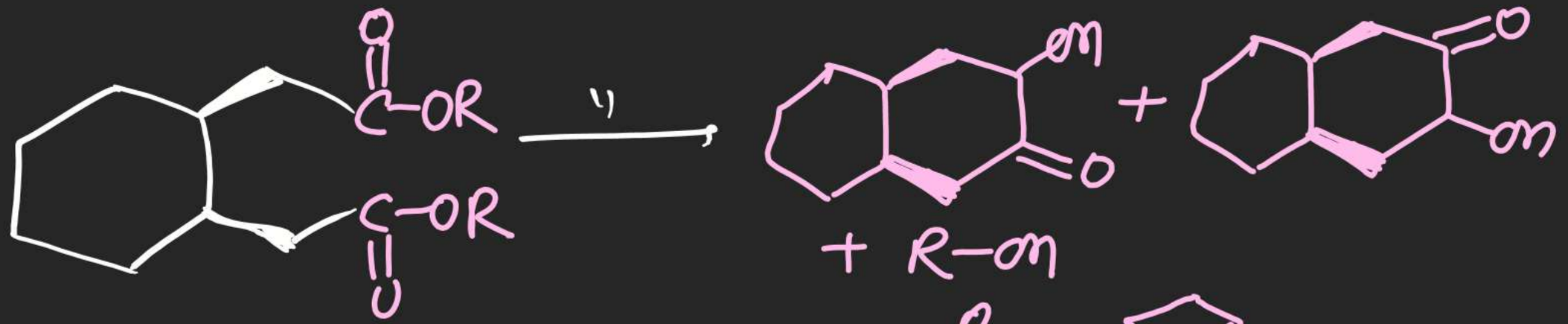
Note (i) Anion Radical intermidiate
(ii) Reduction of esters

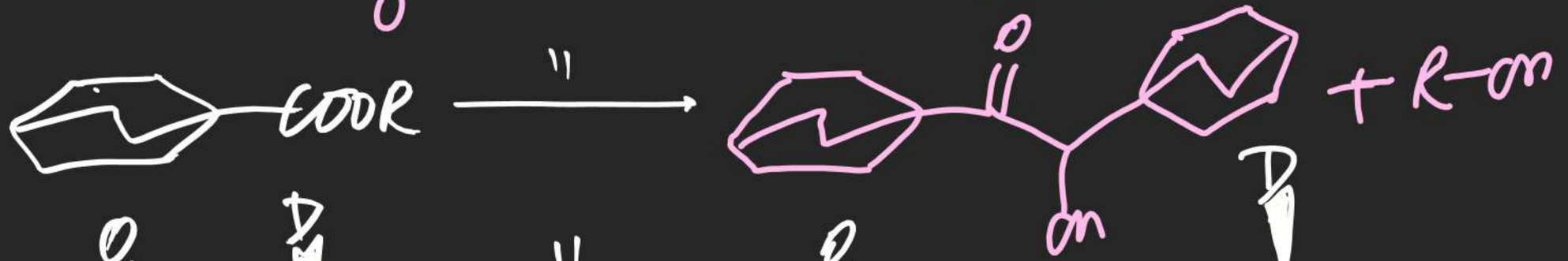
(2) 

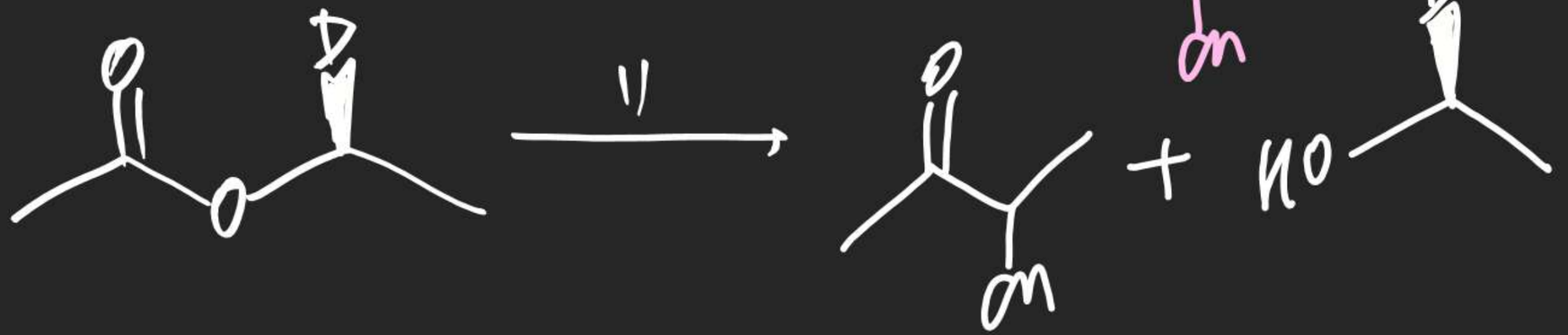
(3) 

(4) 

(5) 

(6) 

(7) 

(8) 

(#) Wurtz Reaction:

⇒ In this Reaction alkyl halide is treated with Sodium metal in dry ether so that hydrocabon is obtained as a Product.

(1) $R-X + 2Na + X-R \longrightarrow R-R + NaX$

Mechanism: Radical mechanism

$$2Na + 2R-X \xrightarrow{\text{Y.D.R}} 2R^{\bullet} + 2NaX$$

$$2R^{\bullet} \longrightarrow R-R$$

Ionic Mechanism:

$$2Na + R-X \xrightarrow{\text{Y.D.R}} R^{\ominus}\,{}^{\oplus}Na + NaX$$

$$R^{\ominus}\,{}^{\oplus}Na + R-X \longrightarrow R-R + NaX$$

Note (i) Free Radical & Carbanion intermidiate

(ii) Breaking of $\rangle C-X$ Bond is r.d.s

(iii) order of rate of ox^n for R–X

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

(iv) It's Reduction of alkyl halide

(v) Na is highly Reactive metal with moisture hence used in dry conditions

$$H-O-H + Na \longrightarrow NaOH + \frac{1}{2}H_2\uparrow$$

(moisture)

(vi) Formation of Symmetrical & Even no of Hydrocarbon alkane takes place in good yeild By Wurtz Reaction

(a) $2CH_3-Cl \xrightarrow[\text{Dry ether}]{Na} CH_3-CH_3$ (good yeild)

(b) $2CH_3-CH_2-Br \xrightarrow[CH_3-Cl]{Na} CH_3-CH_2-CH_3$ (good yeild)

(vii) Formation of unsymmetrical & odd no of Hydrocarbon alkane takes plane in poor yeild By Wurtz Reaction

(c) $H_3C-Cl + H_3C-CH_2-Cl \xrightarrow[\text{Dry ether}]{Na} \underbrace{H_3C-CH_2-CH_3}_{\text{(Poor yeild)}} + CH_3-CH_2-CH_2-CH_3 + CH_3-CH_3$

CH_3-CH_2-Cl

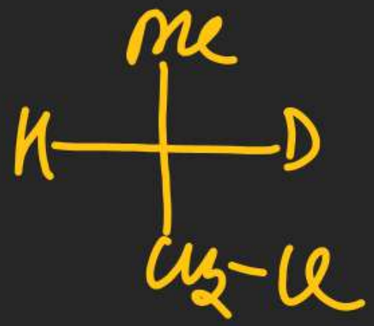
∴

(viii) CH_4 never can be obtained By wurtz Rxn

(1) $CH_3-CH_2-CH_2-Cl \xrightarrow[\text{Dry Ether}]{Na} CH_3-CH_2-CH_2-CH_2-CH_2-CH_3$

(2) 

$\xrightarrow{\text{''}}$

(3) 

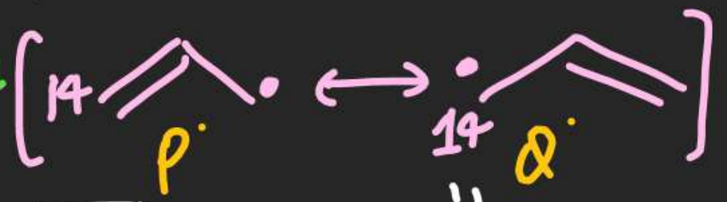
$\xrightarrow{\text{''}}$

(4) 

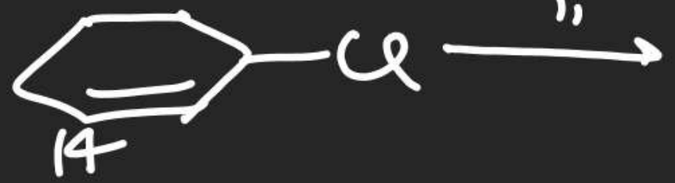
$\xrightarrow{\text{''}}$

(5) 

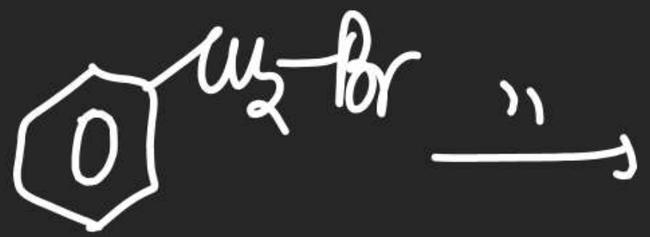
(6) 

Soln: 

(7) 

(8) 

(9) 

(10) 

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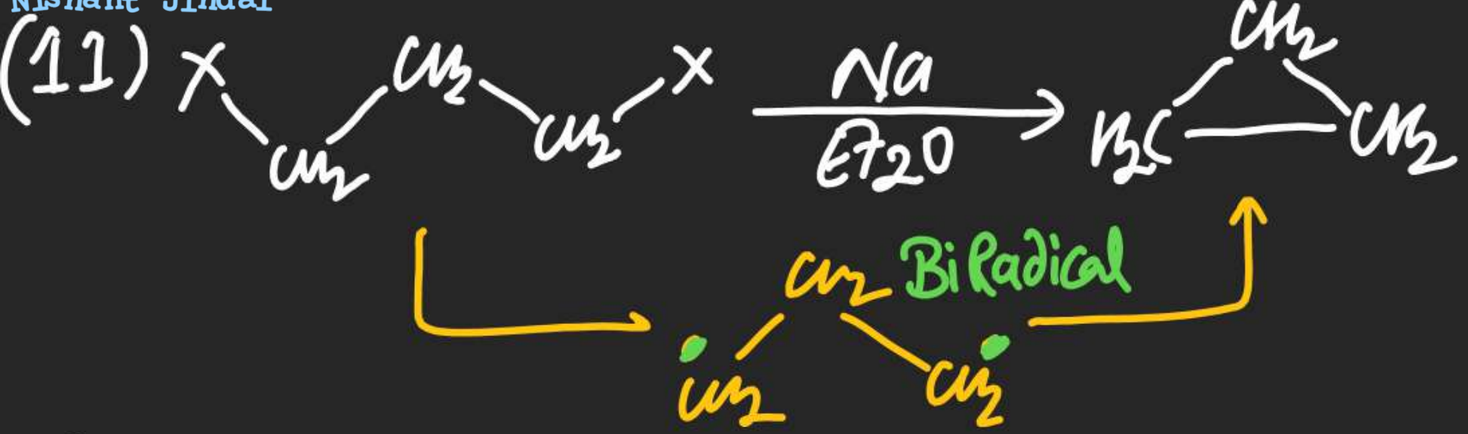
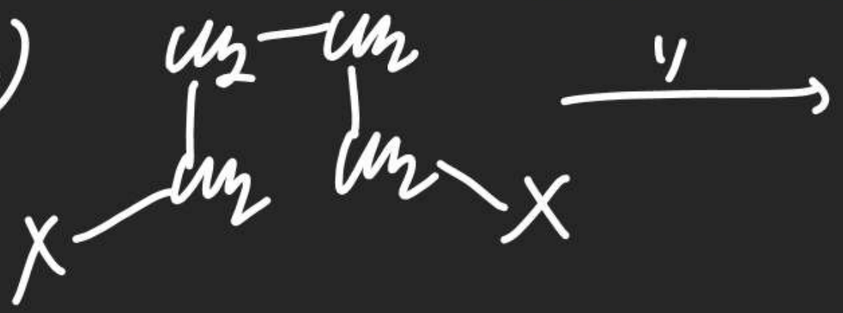
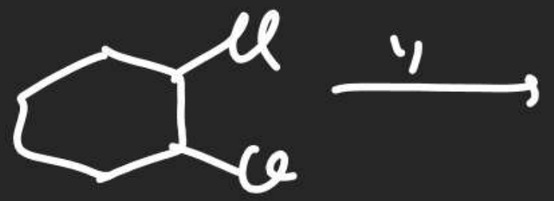
(11) 

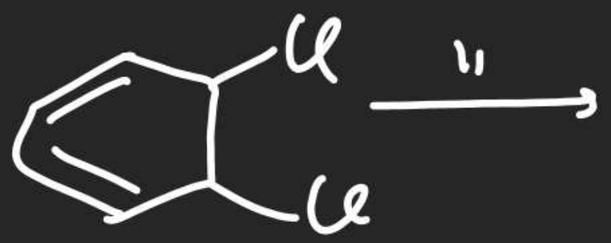
(12) 

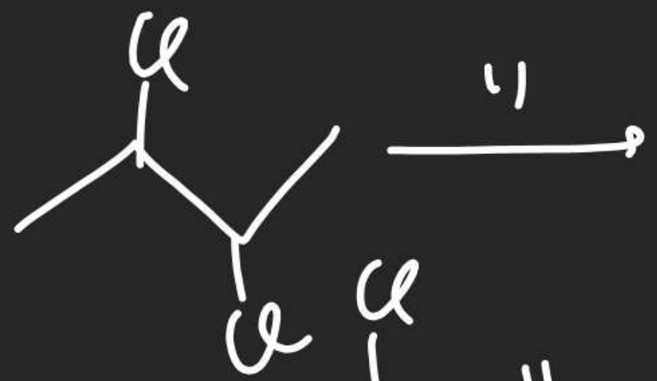
(13) $X-CH_2-(CH_2)_3-CH_2-X$ ⟶ II

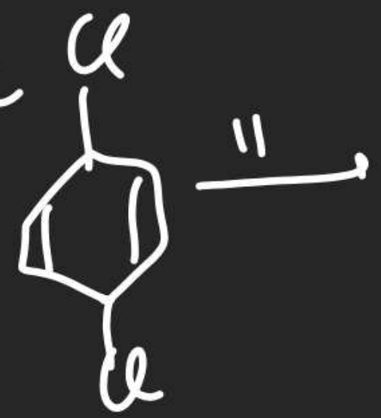
(14) $X-CH_2-(CH_2)_4-CH_2-X$

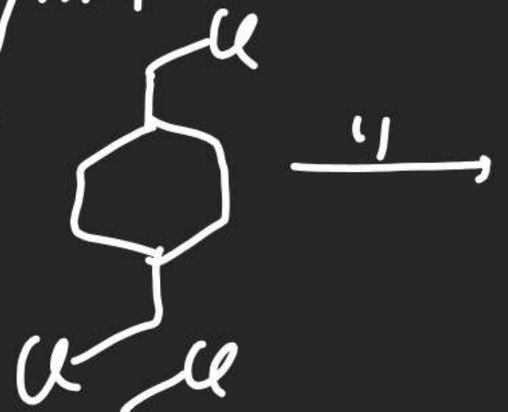
(15) $X-CH_2-(CH_2)_5-CH_2-X \xrightarrow{Na}$ $-(CH_2)_n-$ polymer

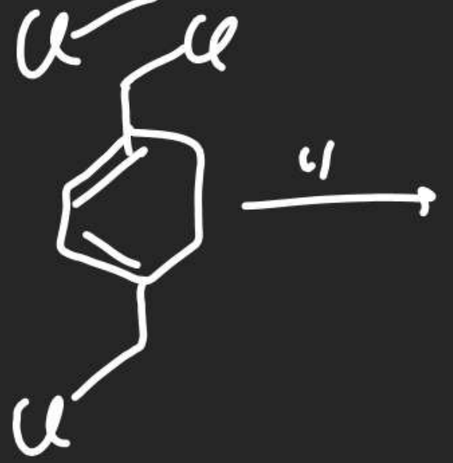
(16)  $\xrightarrow{Na}$

(17)  $\xrightarrow{Na}$

(18)  $\xrightarrow{Li}$

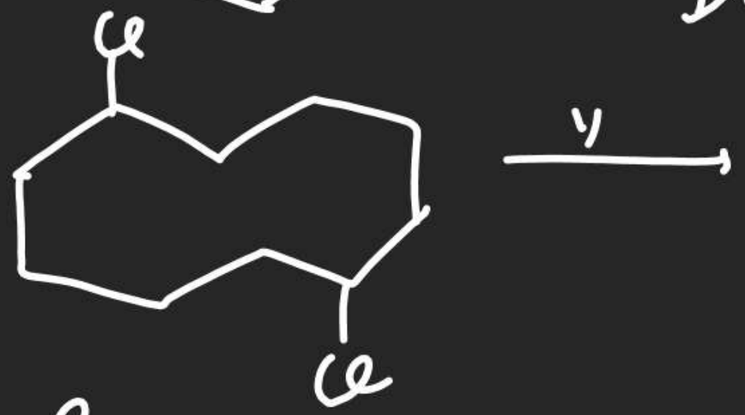
(19)  $\xrightarrow{Na}$

(20)  $\xrightarrow{Li}$

(21)  $\xrightarrow{Li}$

(22) 

(23) 

(24) 

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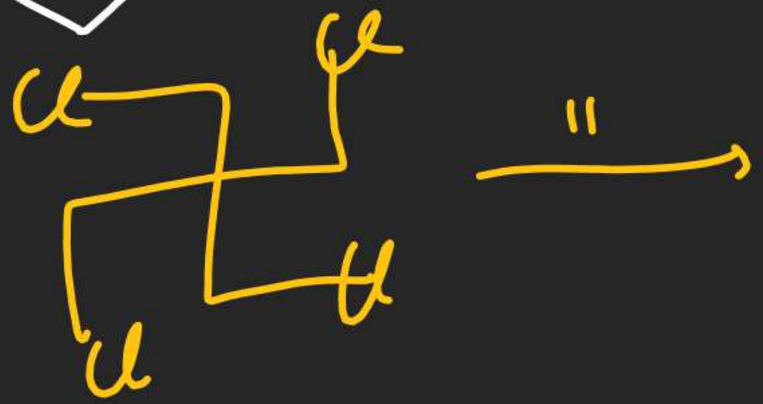
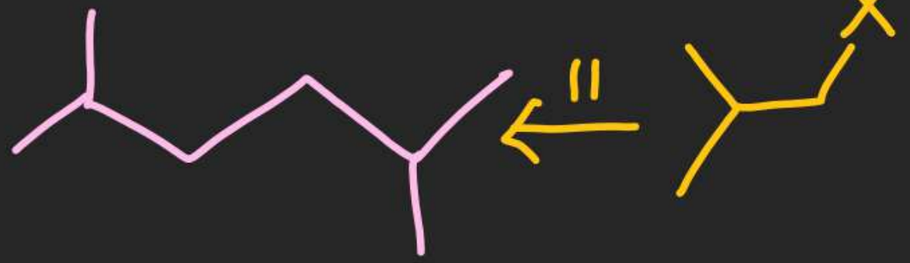
(26) 

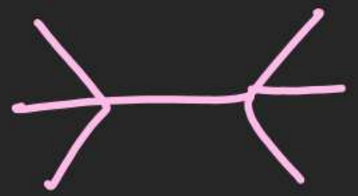
(27) which of the following Never Can be obtained in good yeild By Wurtz Reaction using a Single Reactant.

X (i) 

(ii) 

X (iii) 

(iv) 

(v) 

(vi) 

(vii) 

(viii) 

(ix) 

(x) 

(xi) 

(xii) 

(xiii) 

(#) Fitting Reaction:-

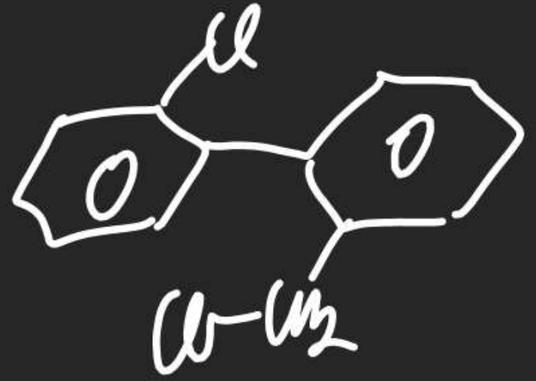
(28) $Ar-X \xrightarrow[\text{in Dry Ether}]{Na} Ar-Ar$

Arye halide

(29)  $\xrightarrow{//}$

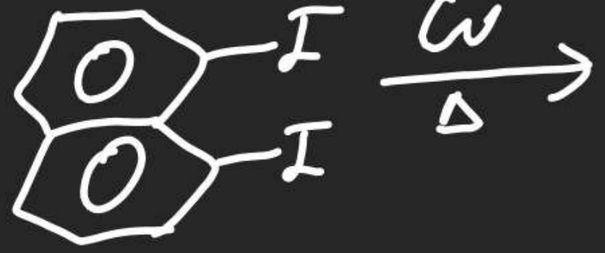
(#) Wurtz-Fitting Reaction:-

(30) $R-X + Ar-X \xrightarrow[\text{in Dry ether}]{Na} R-Ar$

(31)  $\xrightarrow[\text{in Dry ether}]{Na}$

(#) Ullmann Reaction:-

(32) $Ar-I \xrightarrow[\Delta]{Cu} Ar-Ar$

(33)  $\xrightarrow[\Delta]{Cu}$

(#) Frankland Reaction:-

(34) $2R-X \xrightarrow{Zn} R-R + ZnX_2$

(35) $CH_3-CH_2-Ar \xrightarrow{Zn}$

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M.I.P

(36) $2\,H\text{-}CCl_3 + 6Ag \longrightarrow H\text{-}C\equiv C\text{-}H + 6AgCl$

"Ethyne"

(37) $2\,H_3C\text{-}CCl_3 \xrightarrow{6Ag}$

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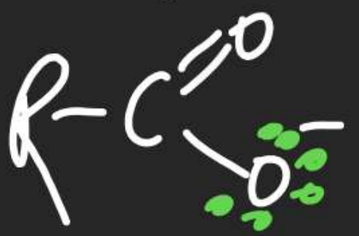
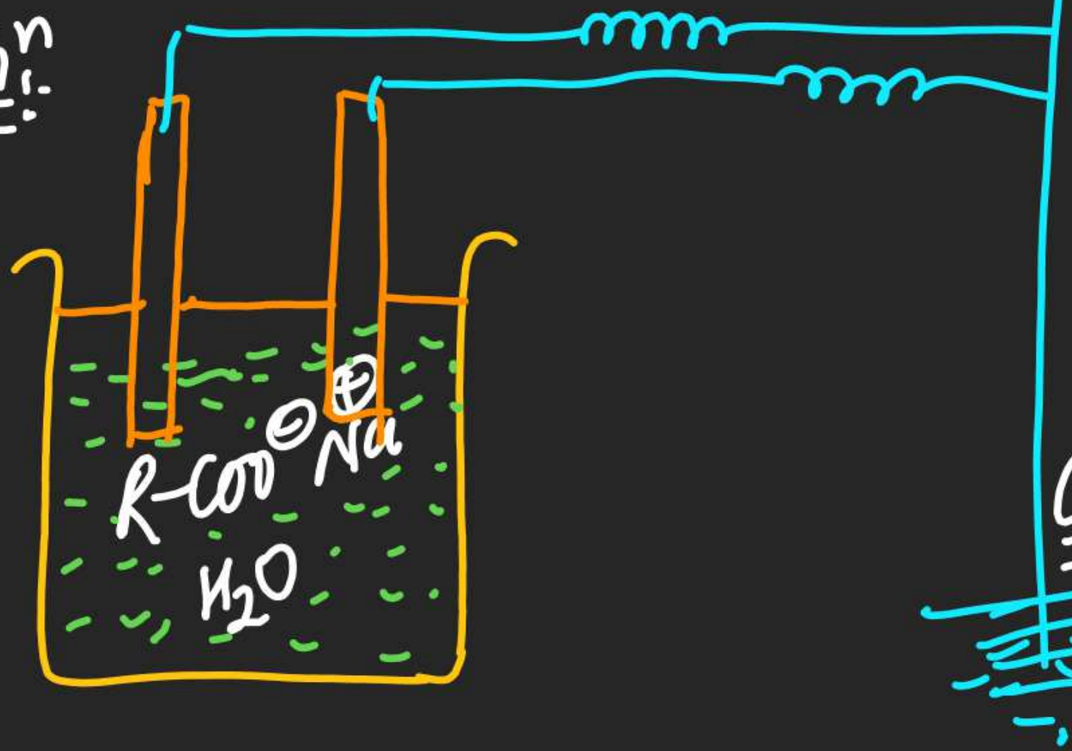
(#) Kolbey's Electrolysis :-

⇒ On Electrolysis of Aq. Solution of Sodium Salt of Carboxylic Acid gives Hydro Carbon as a Product.



(1) $2R-COONa + 2H_2O \longrightarrow R-R + 2CO_2 + \boxed{2NaOH} + H_2\uparrow$

Mechⁿ :-



Anode :- (Oxidation)

$R-C(=O)-O^{\ominus} \longrightarrow R-C(=O)-O^{\bullet} + e^{\ominus}$

$R-C(=O)-O^{\bullet} \longrightarrow R^{\bullet} + CO_2$

$R^{\bullet} + R^{\bullet} \longrightarrow R-R$

Cathode (Reduction)

$H-O-H + e^{\ominus} \longrightarrow H-O^{\ominus} + \frac{1}{2}H_2\uparrow$

Note (i) Free Radical intermidiate

(ii) CO_2 is evolved at Anode

(iii) H_2 ——————— Cathode

(iv) pH of Rxn ↑ as Reaction Proceeds.

(v) CH_4 never can be obtained.

(2) $CH_3-COONa + H_2O \xrightarrow{KE}$

Sodium Acetate

(3) $CH_3-CH_2-COONa + H \xrightarrow{\quad}$

Sodium Propionate

(4) $CH_2-COONa$ / $CH_2-COONa$ $+H_2O$ $\xrightarrow{\Delta}$

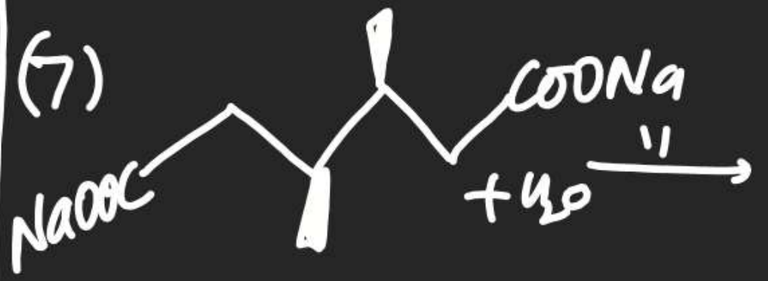
Sodium succinate

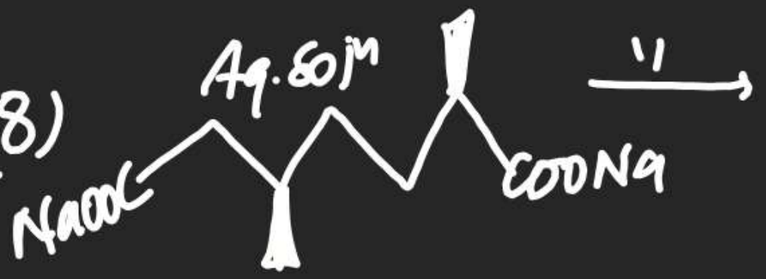
(5) $CH-COONa$ // $CH-COONa$ $+H_2O$ $\xrightarrow{\Delta}$

Sodium maleate

(6) $CH-COONa$ // $NaOOC-CH$ $+H_2O$ $\xrightarrow{\Delta}$

Sodium Fumarate

(7) 

(8) 

(9) 

(10) 

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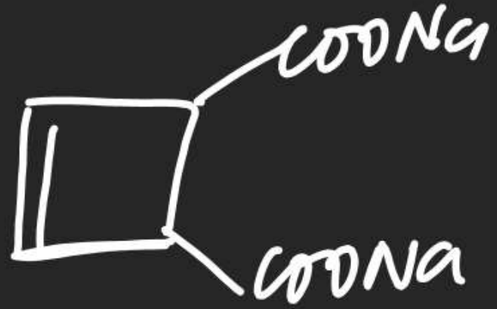
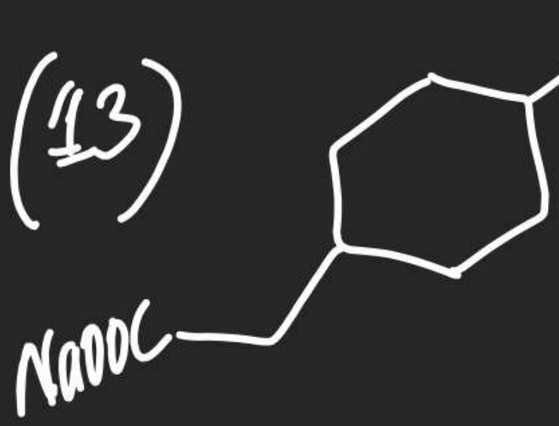
(11) 

$+ H_2O \xrightarrow{''}$

(12) 

$+ H_2O \xrightarrow{''}$

(13) 

$+ H_2O \xrightarrow{''}$

(14) $H\text{-}COONa + H_2O \xrightarrow{''}$
(1eq)

(15) $D\text{-}COONa + H_2O \xrightarrow{''}$
(1eq)

(16) $CH_2\text{-}CO_2Na$
$CH_2\text{-}SO_3Na$ $+ H_2O \xrightarrow{''}$
(1eq)

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HW2

Carbocation (Reaction)

1 - 30

Ch-1