



Handwritten Notes On Carboxylic Acids and its Derivatives



* Carboxylic acid and devouaties R-C-L R-2 _OH R-E'-x (Acid halide) R-E-OR (Ester) R-i-o-t-R (Acid anhydride, R-E-NH2. (Amide). * Limp (extremelal method of Preprotion) of CA: Sorr = ACC-(By oxidation of aromatic Sjele Chain: by SOA (Shong overlding Agent) D By oxidation of alkene with soA 0 (11) By 11 11 11 with KMAOy / 0HP/H201A (iv) By oxidation of alkene with ozone H20 without O(V) By " " ailkyne " SOA (vi) " " " alochol with SOA f EXAMSROADOFFICIAL < EXAMSROAD 🞯 EXAMSROAD 💟 EXAMSROAD

(B) By oxidation of Aldehyde and betone with som 11 12 by tollen's Reagent 9 11 11 with felhing and Bendjuit (10) ", " Shiff Reagents. 17 11] " " aq. Hgcl2 sol 12 0 " " Per acid [Bay ey v 13) be By Perking Condensation Rry 14 Refermatsky Rrn 15) 16 "Hydrolysis of Nitrile or Cyande :> $R-C=N \xrightarrow{H_{30}} R-\dot{c} - oH$ Dil. H2SOY Mech" $R - C = N: \frac{H_30^{\dagger}(H^{\dagger} + H_2)}{2} \int R = C = N - N \in \mathcal{R}$ $\begin{array}{c} \alpha_{H} \\ R-\dot{c} - \alpha_{H} \neq R - \dot{c} = R^{H} \\ \Theta_{R} \end{array} \xrightarrow{\sim} R - \dot{c} = R^{H} \\ R - \dot{$ 1/ 1/20' $-\mu n_3 \qquad = n$ = $R - C_{ON}$ $R - \frac{c}{c} - \frac{c}{w} \frac{n}{n} = \frac{c}{c} - \frac{c}{n} \frac{c}{n} \frac{n}{n}$ 0-4 f EXAMSROADOFFICIAL < EXAMSROAD 🞯 EXAMSROAD 💟 EXAMSROAD

in Pholy ? CN Convertinto R-C=0 COOM $cn_3 - c = N - \frac{H_2 q' \mu^2}{2}$ CH3 - COOM Q.) 0004 11 C=N Cory CEN e Note: Hydrolysis of (-C=N) with H_2O can also be done in $Cn_3 - C=N$. H_2O/ON $Cn_3 - CoO$ the Bresence of Base. (17) By tydrolysis of acid halide : $R - \dot{c} - \dot{x} + \frac{H_2 O/H^2}{R}, R - \dot{c} - OH + Hx$ Acid halide Q - CH3 - C-CI H20/H7 CHg-d-OM + MCD >- ê-a _ ё-он + нср *1 2) 0, 12-00 i'd 11 (3) D 0 -1 2nce 5-01 -071 f EXAMSROADOFFICIAL < EXAMSROAD 🞯 EXAMSROAD 💟 EXAMSROAD

Mech": SNAE * Note 2 CH3-C-CP H20100 CH3-C00 * By hydrolysic of Acid Anhydried! R-d'-0-d-R-H_0/H+ R-d-on+H0-d-x1 Q. cn3-d-0-d-en3 H20/Ht, 2 cn3-loon J-d'-cng " - Coon + Ch3 - "C-07 Miolut on Mote: Hydrolysis of (Anhydride) with H20 Can be done in the presence of Base cn3-é-0-é-cu3 H20/00 2CM3-C00 * By hydrolysis of Actor Rester - in The Researce of Acid R-2-0-R' H20/4+ R-C'-01 + H0-K/

Mech": Depending upon Nature of Rand R! it may about by Anyone of following B Mech": AAC2 - HECH Bimolecular Acid Cutalysts by Acyl bond Hech m Lunimolecular Alby bond 11 J Hech la AAL' -R-E-O-R' Acyl 1 Hud bond Alpyllond when R, R 7 3R° Alleyne/ Q. me-l'-18-cn2-cu, M20/mt cn, - l'-on the et $\frac{\alpha_{3}}{\beta} = \frac{\beta}{12} - \frac{\beta}{12} - \frac{\beta}{12} - \frac{\beta}{12} + \frac{\beta}{12} - \frac{\beta}{12} + \frac{\beta}{1$ 3 Rt me-t'-t'- cus "' Cus -t'-on tHO-G CH3 9. me-i-o-o-() == me-i-or + Ho'-ph · Points - 1 My drolypis of ester in the Presence of Acid gives Carboxylic acid and Alcohol Hydrolysis of ester in the Fresence of Acad is EXAMSROAD O EXAMSROAD **EXAMSROAD**

* In hydrolysis of all ester in the Presence of Acide Alleyt and Acyl both workt make may Break. Bt depends of Mature of R and R' (Hydrolysis of esters Hech" occurs * Altyduolysis of ester in the Bresene of Base? R- é-ôri M20/NOOM R- é'érê + HO-R' salt of Auid. * Hydrolysis of ester also occur in the Presence of Base * In the Presence of Base Salt of Garb Set Caubolysic * In the " " " Rx" is Prreversible. * Hydrolysis of Bester in the Presence of Base sponi is called sponification. Dohen R'= 3° Alleyt D' R'= me 3 Rest occur.

Q. Me- C'- 2 - CH2 (3) me-d'-0-c-aug in aug-d'-one + Ho-d c (4) me - e - of (2) in me - e - Brood + xao - ph > x brenenal * RX"'s of carbonylic acid! * Effect of heat an carboxylic acid & related compounds DCA Hydroxy acid Amino ciuid J MiciA R-COOM HOOC (H2C)- COOM (m=91,2, ---) J Heat Direct with Sodalimo. Debbed of Direct Heaton MCA (mono Couboryli's acid): R - 2' - 0n - Arr R - 2' - 0 - 2' - RR - 2' - 0n - 2' - Rf EXAMSROADOFFICIAL < EXAMSROAD 🞯 EXAMSROAD 💟 EXAMSROAD

 $a. cn_3 = \frac{b}{c-on} \frac{p_2o_5/p_1}{2o_5/p_1} \frac{cn_3 - \frac{b}{c} - o - \frac{b}{c} - \frac{cn_3}{p_2} \frac{or}{Ac_2} \frac{Ac_2}{c}$ 2) Ph-c-on * Effect of the at im the Reenence with Sodo lime (your + cao) (Nam + cao)/10 Chy of Co2(h) Ch3-Coon 2 $ph - h + co_2(n) \circ (o) + co_2 \pi$ (2) ph-Coon $-n \neq Co_2(n)$ COON 187 + + 602 Coon (5) $H_{2}C = Cn - Coon , H_{2}C = CH_{2} + Co_{2}(A)$ Mekh"; $R - \overset{\circ}{\mathsf{L}} - on + Non = R - \overset{\circ}{\mathsf{L}} - \overset{\circ}{\mathsf{O}} \times \overset{\circ}{\mathsf{D}} + \overset{\circ}{\mathsf{H}}_{,c}$ R-C-ONA + CAO KDS NAR + CALOZ H-O-n + Nak - R-H + Naon $Caco_3 \xrightarrow{D} CaO + Co, (t)$ 🕑 EXAMSROADOFFICIAL 🤜 EXAMSROAD 🔟 EXAMSROAD 😏 EXAMSROAD

JAAJA+ 80-2 akcoler & ether Important points' This Rxh is known as to be wear cosporylic acid Roy by This method carboxylic acid and its salt can be converted to Hydrocarbon. 2) It Orreu by Carbonanion for mation. is a stability of carbonian form No. decide decreasing order of Reactivity of following molecules toward decarboxy lation, program $= \underbrace{c_1 c_2 c_3 - \underbrace{c_0 c_1}_{i_3} - \underbrace{c_0 c_1}_{i_3} - \underbrace{c_0 c_1 - c_1}_{i_3} - \underbrace{c_0 c_1 - c_1}_{i_3} - \underbrace{c_0 c_1 - c_1}_{i_3} - \underbrace{c_1 c_2 - c_1}_{i_3} - \underbrace{c_1 c_1 - c$ 17273 O che Cuon > ch - Coon Note: "Reactivity towards ~ -m/-n/-Igh at a decarboxylation 2) if strong (= M) with drawing (-M) Present on a carbon then such carboxylic acid so de carboxylation Rry only on heating (without use of sodaline) for En-Breto acid, a nitro acid zemaicarboxylic acid, B-eminoacid, BY unsaturated Ac 🚹 EXAMSROADOFFICIAL 🤜 EXAMSROAD 🔟 EXAMSROAD 😏 EXAMSROAD

* affect of Heat on B-rate and /B-Imino acid / P, 1- a unaturated acid - R-d'-cu, -d'-n A R-d'-cus B-"keto acid -cor M2C $\begin{array}{c} R = C = Cn_2 = C = on \quad A = \int R = Cn_2 \\ P = X = B Y - unseduced = -CO_2(CT) \end{array}$ Ho - i' - an - i' - an - i - an Mo - i' - an Lien-den DCA R - c $R - C_{1} \rightarrow C_{1} \qquad (\eta)$ 0 R-d'-eng

cu3-c'-cy3 Q. cuz-l'-cnz-l'-on _ n Ph-d-cuz 3 ph-l- cm2 - l'-on 0 3 -on (9) Coord C001-1 0 3 1584 Com COONH com 0 Coon 6 1 Com NOOC work with cus AA 1 (A) con effect of Heat on DCA: ¥ 0 0 c - c' - conCom COON - 01 coon Coon 12-DCA 1,3- DCA 1,4 - OCA (oxyalic acid) (malonic acid) 5-0CA (Succinic acid) ORA J1 - (02 10) Jr - 002(n) 1- 420 L 0-8-0 M-won cuz-coon S. .. onhydricle 🕑 EXAMSROADOFFICIAL 🤜 EXAMSROAD 🔟 EXAMSROAD 💟 EXAMSROAD

 $\frac{c-c-c-on}{c-c-c-on}$ 1,6 DCA C-e-m -Co2(1) -n20 1,5 - DCA UNA c - c - c' - on C-C-C-C'-OU C-C-C-C-OM с-с-с-оч 11 17-OCA (PA) folymel. 1,4-11,5-DCA =H20 Annychide cyclic 16-117-OCA -OZALO Cyclic annydride 18-1 1 m-DCA _____ Polymer

* Effect of Heat on Hydrory dicids " OM D , R-cn Cu-R R-CH G-OH × -HA/2-HA B, R-cn=ch_c' $R - CH - CH_2 - CH_2$ B -HA 3-HA Y- Lactone Y-HA/4-HA $R - cn_2 - cn_$ S-Lacteno 8-HA15-HA W-HAL 6-HA w-Lactone (Cyclic ester). Mustable) - 0-(cm2) - 0 + cm2) - -Polyster (Polymen 🕑 EXAMSROADOFFICIAL 🤜 EXAMSROAD 🞯 EXAMSROAD 😏 EXAMSROAD

X-HA D. Dimen B-HA & ~B-unaturated Add Y-HA D, Y-Lactone (Cyclic ester.) S-HA D, S-lactone (Cyclic ester.) W-HA > io - Lacterie Dy Polymer X 100 R-cn - cn - R 6 J R CO _ O R RIMME meto Pos=x Cos=x P.03 = X (003 = L OA (2) OIA O Effect of Heart on Amino acid! R-CN C-ON, R-CH CO-NH-CO ~-AA/2-AA $R - cn - cn_2 - c' \xrightarrow{\rho} R - cn = cn - c'$ B-AH/3-AA P R NN SO -n20 R Y-leictame $R - cn - cn_2 - cu_2 - c_1^{OM}$ $\frac{NH_2}{R-cn-cu_2-cu_2-cu_3-c_1} \xrightarrow{on} R$ Y-AA/4-AA S-Lactame AA f EXAMSROADOFFICIAL < EXAMSROAD 🞯 EXAMSROAD 💟 EXAMSROAD

NUL -au, -c A Nn-Enz anz -anz -anz w-Lactane (cyclic amide) unstable Nn font denn tenze den NH fenze Palymel (Nylon-6) ~-AA _D, Dimel B-AR _ ~ ~ & B-unsaturated Acid Y-AA ____Y-lactame (ydlicomide) 8- AA A S-Lactame W-AA D, w la chame of Palymer Nylon 6 Revitors R ON - NH2 0 -> NH. * Effect of Heat on ca-salt of carbonylic acids: D R-E-R + Carcos to cat Ch3 - e- ch3 + Caloz CM3 Que : Con ch3 - c-0 🕑 EXAMSROADOFFICIAL 🤜 EXAMSROAD 🔟 EXAMSROAD 💟 EXAMSROAD

(H-coo)2 Ca D, H-E-H-+ COLO3 (2)3) Ph-d'-on Carcons, /A (Ph-d'-o), Ca -1,0 Ph-t'-Ph Insymmetrical ca-salt of Acid $R_1 - d^2 Ca \longrightarrow k_1 - C - k_1 + k_2 - C - k_2 + k_1 - C - k_2 + Caco_3$ k2-c-0 Que! Ph-d-o $c_{0} \longrightarrow Ph-t-Ph+H-t-H+Ph-t-h+f(qco_{3})$ 1H-C-0 * Effect of Heat on Mn - Salt of Carboxylic acids: R-d'-R-E-R+ MIn CO3 pin F-q-0 E-q Mn A, Chg-E-ey, + Mn Coz ch3-CM3-C-0 Ph-Coon Hnp/b, Nept Pen Ø f) EXAMSROADOFFICIAL < EXAMSROAD 🔟 EXAMSROAD 💟 EXAMSROAD

Unsymmetrical any-satter Acid $\begin{array}{cccc} R_1 - \ddot{C} - \Theta & & & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & \\ R_2 - C - \vec{O} & & \\ & & & \\ & & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & & \Theta & & \Theta \\ & & & \\ & & & \\ & & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & & & \\ & & & \\ & & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & & & \\ & & & \\ & & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & & & \\ & & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & & & \\ & & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & & & \\ & & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & & & \\ & & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & & & \\ & & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & & & \\ & & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & & & \\ & & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & \end{array} \xrightarrow{} \begin{array}{c} \Theta & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & \end{array} \xrightarrow{} \begin{array}{c} \Theta & & \\ \end{array} \xrightarrow{} \begin{array}{c} \Theta & \end{array} \xrightarrow{} \begin{array}{c} \Theta & \end{array} \xrightarrow{} \begin{array}{c} \Theta & \\ \end{array} \xrightarrow{} \end{array} \xrightarrow{} \begin{array}{c} \Theta & \end{array} \xrightarrow{} \end{array} \xrightarrow{} \begin{array}{c} \Theta & \end{array} \xrightarrow{} \begin{array}{c} \Theta &$ U. Ph- Coon Mnopp ph-c-on ph-e-on y ph-e-on ph-c-o ph-c-o ph-c-o * Esteri-fication fisher-esterlificator or Rxy of Acid with Alcohol: R-d'-on + R'-on H' R-d'-OR' + H20 Q' Ph-L'fon - HO-Et Ht R-C'-OSt Beuzoic auid Cetury beuzoate of Ch3-l'-on THO-Et HT Ch3-l'-OEt. Ethyl acitab 3 ph-E-on + HO - Ph = ph-E-oph Phynel Benzoic **(f)** EXAMSROADOFFICIAL **(**) EXAMSROAD **()** EXAMSROAD

 $\frac{1}{2} = \frac{1}{2} = \frac{1}$ c-cy, Sal icylic acid 07 0, = H1/A .e-0-0) 0 -1 (Analgessic Phonyls clicylaite (Antiseptic 5 sallo) an M-1/ A D -on 8- OCH3 CH3 methylsalicylate (ait of winter green) Mech $R = C^{(+)} R =$ MA () () · SNAE R-on Hon it R OR R OR' Ester RXY Inter mediate 2. Decide reactivity order of following Acid / Alcohol toward Esterification (a) H-Cooh > me-coon > et-coon, > coon, --Cooy on > et-on > > on > > 13) me--04. Esterification × 1 steric triuderence 🕑 EXAMSROADOFFICIAL < EXAMSROAD 🔟 EXAMSROAD 💟 EXAMSROAD

* Ran of acid with Amonia $\frac{NH_3}{Baye}$ $R - C' = ONH_4 = A$ $R - C' = ONH_4 = A$ $R - C' = NH_2$ R-U-OH Ammonium Salt of carboxylic acid NH3, CH3-C'-ONHy Ammonium Q. Chg-E-on acetate) NM. 10, CM3 - E-NH2 (Acetamide) Ph-d'- SNHy (2) Ph - "-on NH3 Benzoic acid NH3/12, Ph-C-NH2 0 0 l'-on (3) NHZ ____(B)___ c _ 07 E-ONHY Phthalic P.h.thalamide acid C-ONHy SWAE A strong Heat 0 Phthalimide. HVZ RX" [Hell- Volhand- Zelinsky Rx"]: Rx" of Acid with Red -P/X2 . R-CH, - 2-Un Red-Plx2 X R-CH-E-OH 0 Acid with ~ -n Here Reef-P taken au in small amount. f EXAMSROADOFFICIAL < EXAMSROAD 🞯 EXAMSROAD 💟 EXAMSROAD

· F This ux" is also known as ~ Halogination Rx". CM3-COOH Red-P+Cl2 CM2-C-OH Q. Ch3 6-071 - CH, - COOH , cn2-cH-Ph -(3) CH2 - COOH , Ph-CH-COOH (4) - cn - c'-on -CH2 - COON -铁铁铁 +5 Arndt Eistert dyntheris -O socl2 R-COOM @ CH2N2 (Diaxomethane) @ Ag20/A -CH, -COOH (IV) H20/Ht * This Rxn is known as caubon - upgradation Rxn In this Rxn Lower no. of Carboxylic acid changed to Higher member ()Ph-COOH Ph-CH2-COOM CH3-COOH on cu, - Coon U y - Coon -CH2-COOM Q CM3-C42-COOM Ch3-CH2-Ch2-COOH. 🕑 EXAMSROADOFFICIAL < EXAMSROAD 🔟 EXAMSROAD 💟 EXAMSROAD

R-on- HE PU,

Soci2 $R = \frac{2}{C} - \frac{2}{C} + \frac{2}{C} = N^{2} + \frac{2}{N} = N^{2} = N^{2}$ Rech": R-C-OM - SO, (A) SNAE Ag20 = 2Ag + 10- $D = C = CH - R \leftarrow R - C - CN \leftarrow R - C - CH - N = N$ ketene Acylcaubene N_2 $R - ch^2 = 0$ $H - oh/h^{\dagger}$ $R - ch_2 - c = 0$ (Au'd) H-OR/H+ R-CH2-C=O (CSter) H-NH2/H+ R-CH2-C=0 $\begin{array}{c} 0\\ \hline 0. Ph-\dot{c}-OH & SOCI_2 & \hline 0H_2CNH_2 & HOH/H^{\dagger} & \hline 0\\ \hline 0H_2O/A & \hline 0\\ \hline 0H_2 & \hline 0$ 0 B)-> ph-ch=c=0 C, f EXAMSROADOFFICIAL 🤜 EXAMSROAD 🔟 EXAMSROAD 😏 EXAMSROAD

* Hunsdiecker Rxn 1 R-d' OAG Brz/ccly, R-Br + CO201 + Agbr Q. R-C-OH POIS PC13 Socia, R-E-OCI H2/Ni or Ptorpd (1) H+ (DSBH (I) H+) DBH3/THF., DH+, (1) H++) 14 Red P/HI (NOCH + COO) Na-metal NOH NOON 🚯 EXAMSROADOFFICIAL < EXAMSROAD 🔟 EXAMSROAD 💟 EXAMSROAD