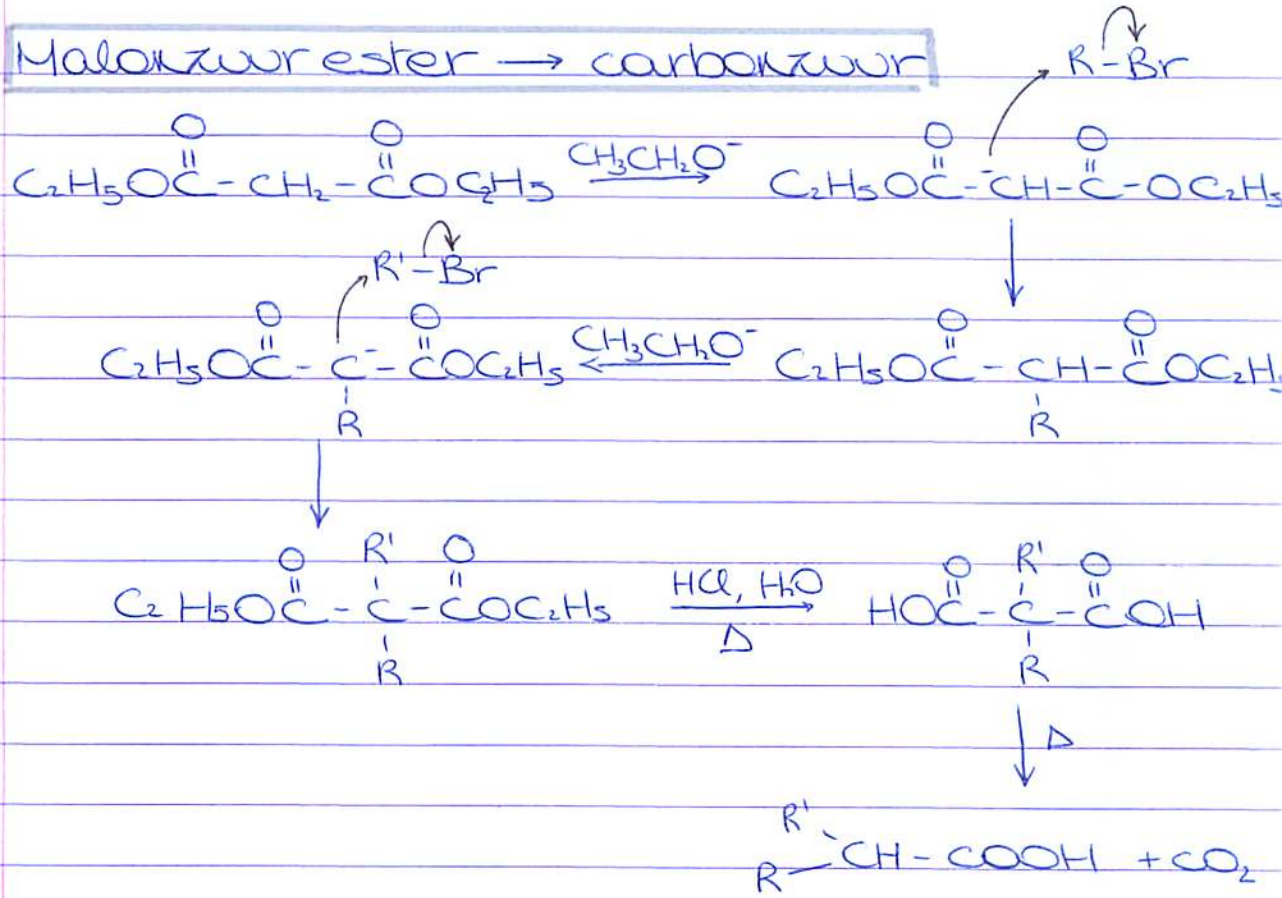
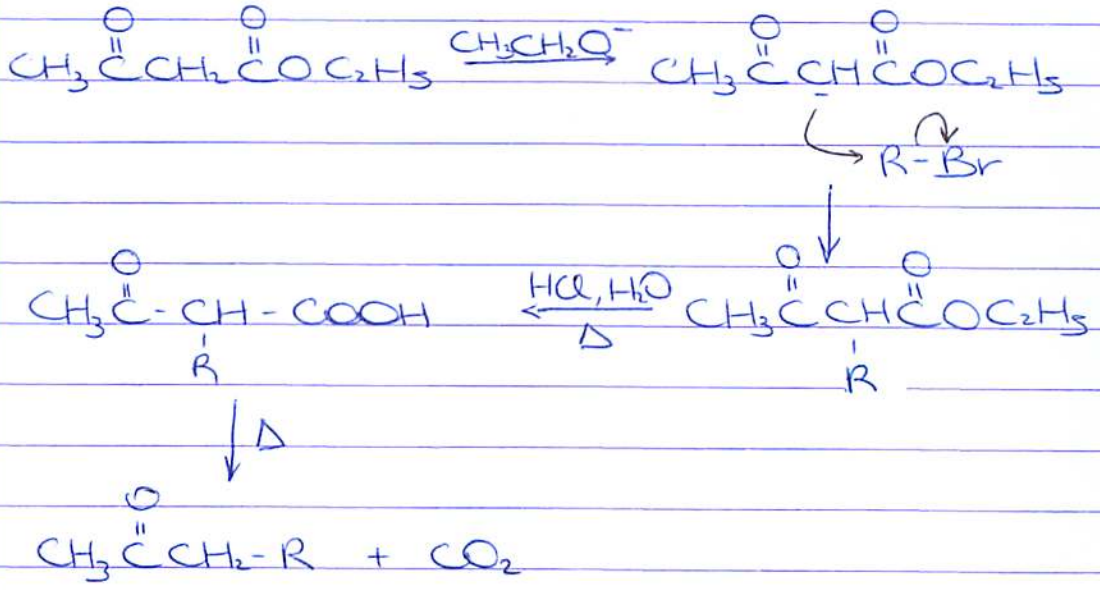
Malonzuur ester → carbonzuur



Acetoacetaat ester → keton



Carbonzuren

Carbonzuur + alcohol → ester

= Fischer verestering

$$CH_3COOH + CH_3OH \xrightleftharpoons{HCl} CH_3COOCH_3 + H_2O$$

evenaar

opgelet: ! carbonzuur + amine

$pKa = 15,7 < pKa = 36$

→ zuur-base reactie

$$CH_3COOH + CH_3NH_2 \longrightarrow CH_3COO^- + CH_3NH_3^+$$

Carbonzuur → zuuranhydride

$$2\,RCOOH \xrightarrow{P_2O_5} R-C(=O)-O-C(=O)-R$$

Carbonzuur → zuurhalogenide

$$RCOOH + SOCl_2 \longrightarrow R-C(-OH^+)-O-S(=O)-Cl \quad LG$$

$$+ PCl_3 \longrightarrow R-C(-OH^+)-O-PCl_2$$

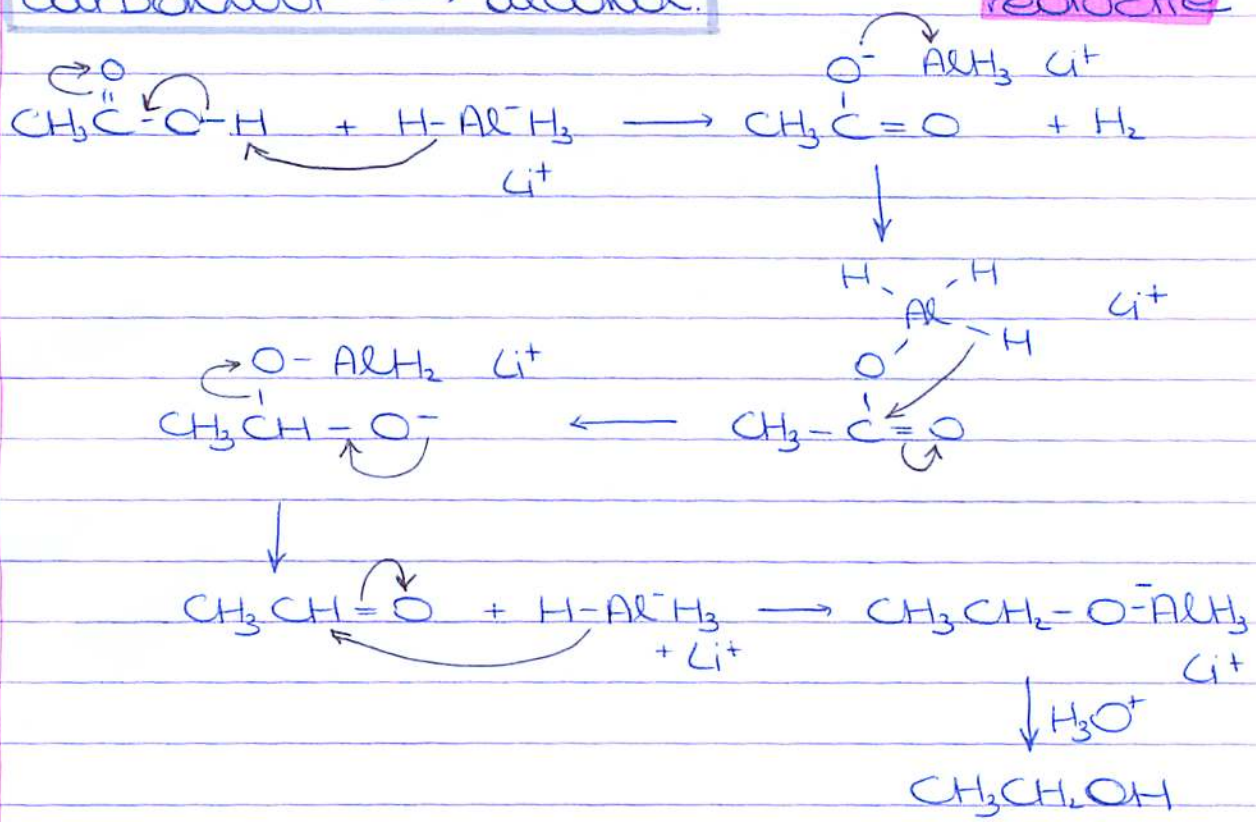
$$+ POCl_3 \longrightarrow R-C(-OH^+)-O-P(=O)Cl_2 \quad LG$$

$$\downarrow$$

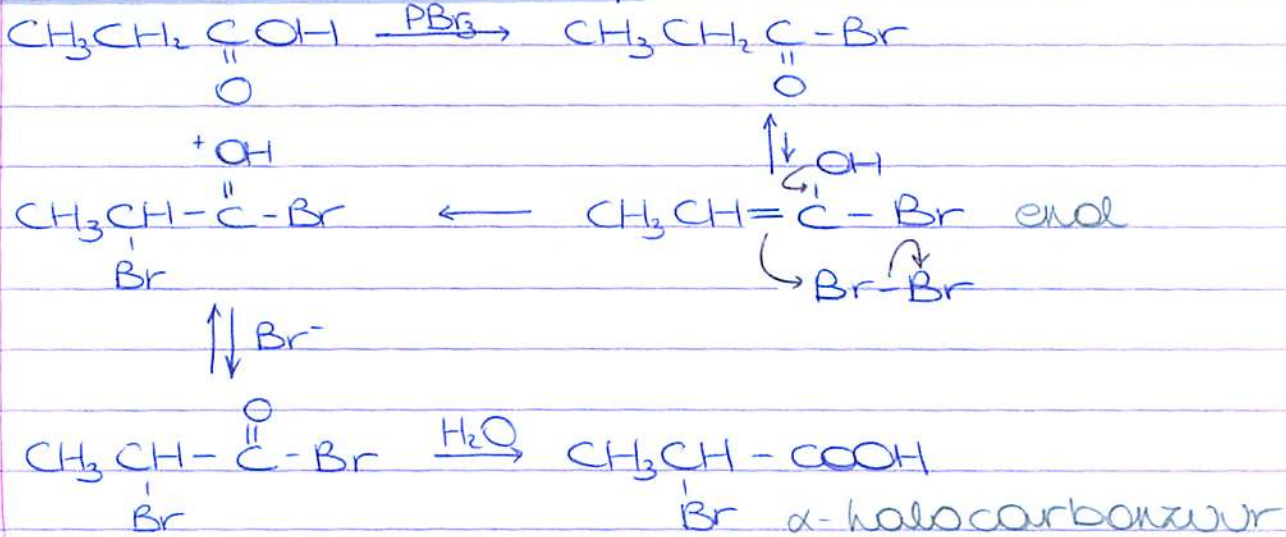
$$R-C(=O)-Cl + HCl$$

Carbonzuur → alcohol

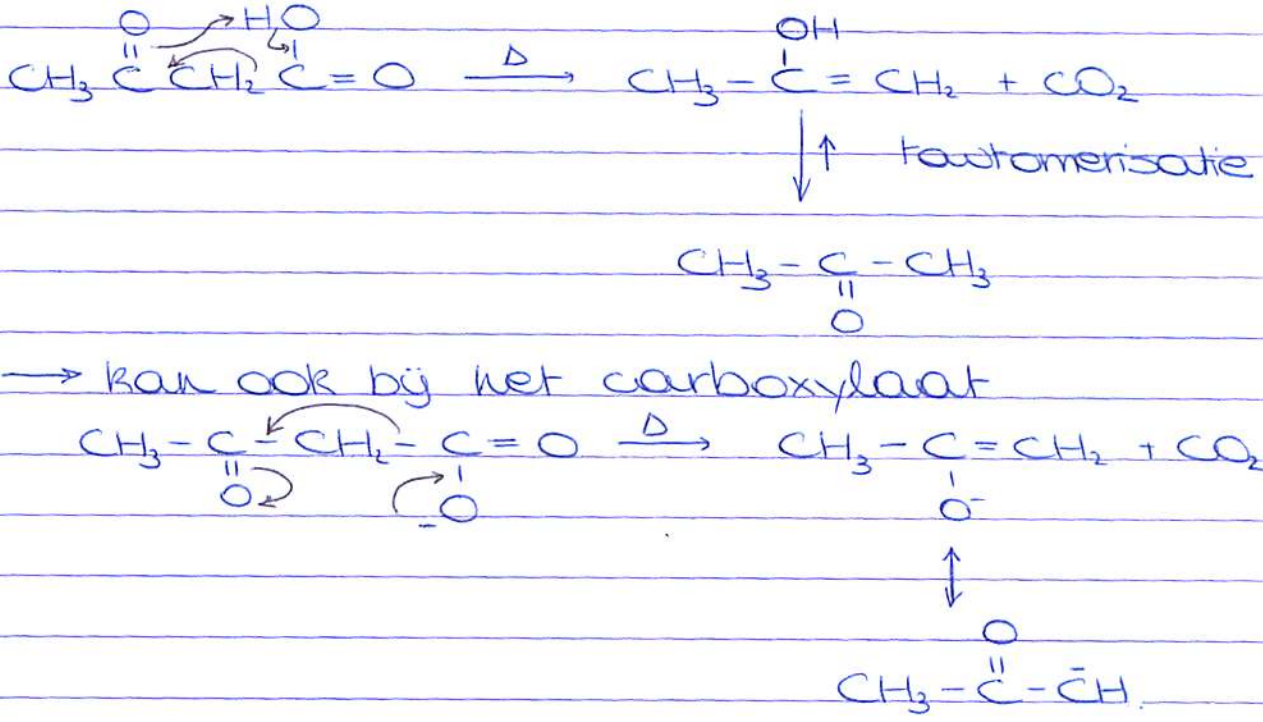
reductie



Hell-Volhard-Zelinsky



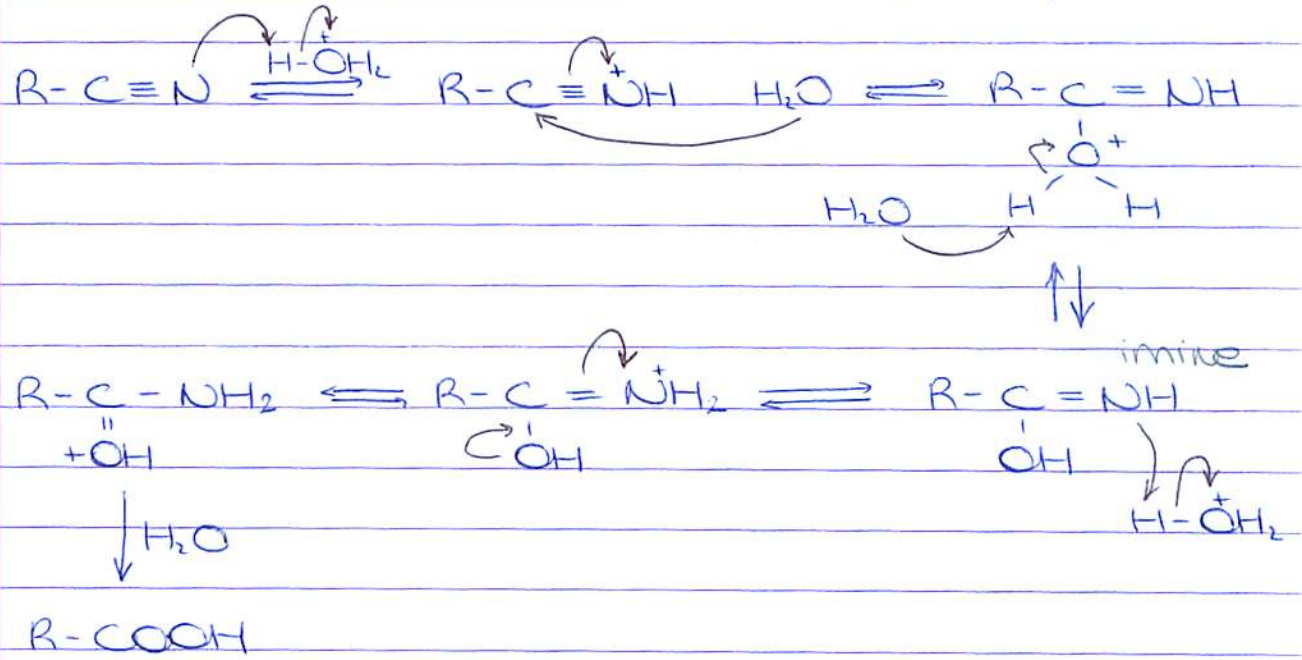
Decarboxylering



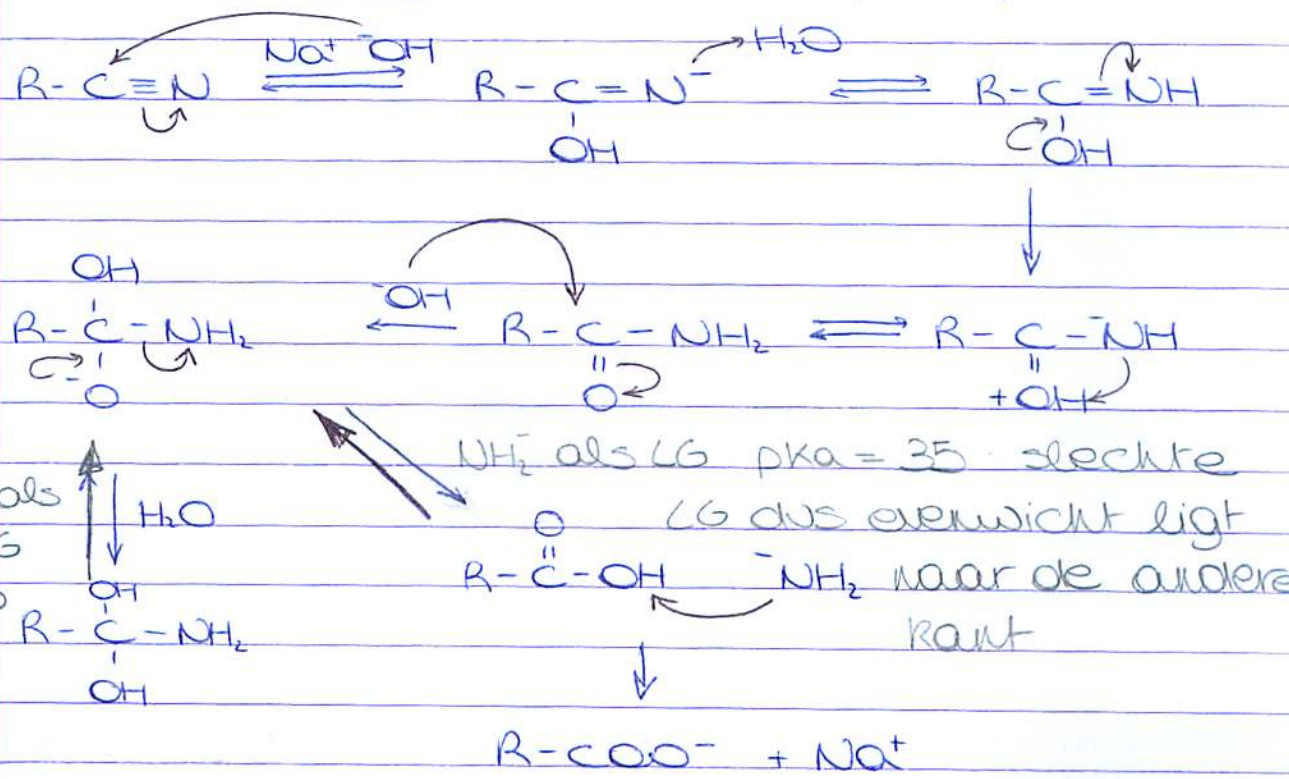
→ kan ook bij het carboxylaat

Nitrillen

Nitril ⟶ carbonzuur = zure hydrolyse



Nitril ⟶ zout = basische hydrolyse

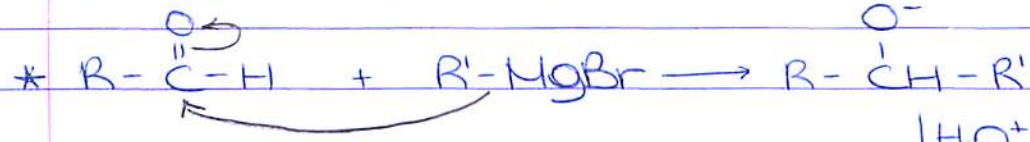


Nitril → amine reductie

$$CH_3CH_2C\equiv N + 2H_2 \xrightarrow{Pd/C} CH_2CH_2CH_2NH_2$$

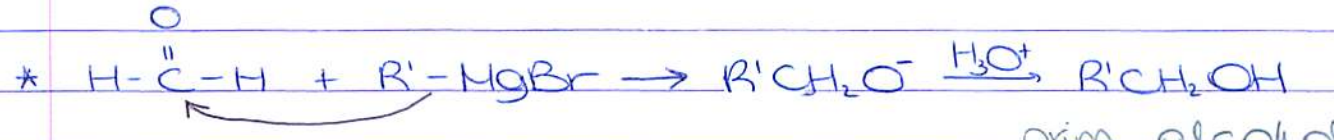
Ketonen en aldehyden

+ organometaal (methode 1)



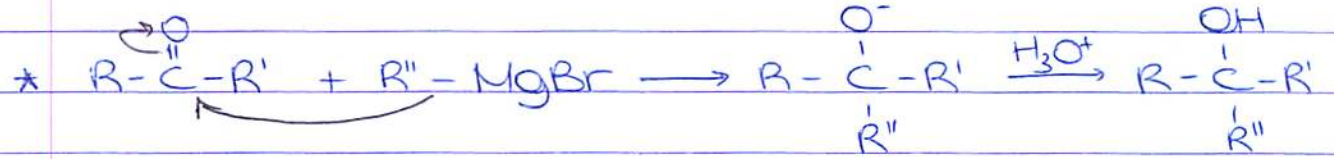
aldehyde

$R-CH(OH)-R'$ sec alcohol



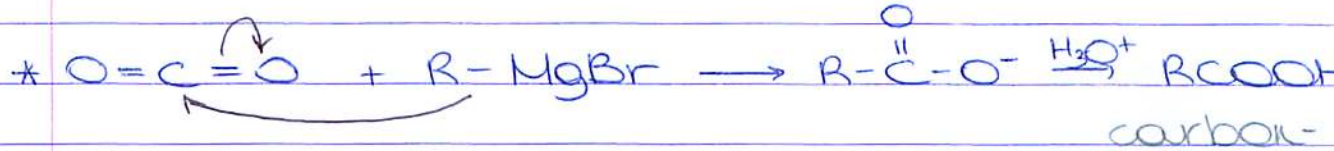
formaldehyde

prim alcohol



keton

tert alcohol

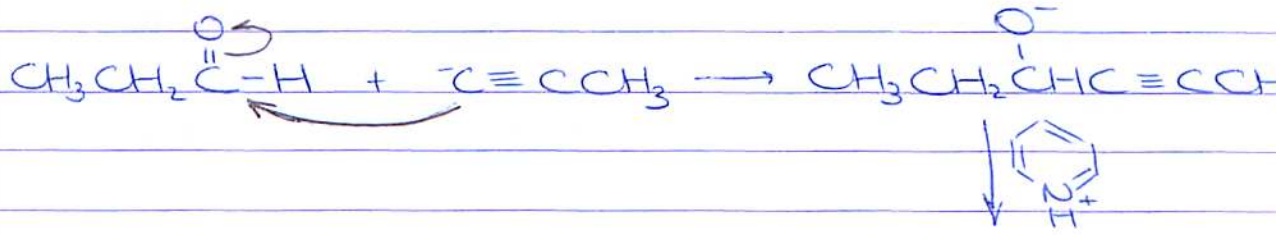


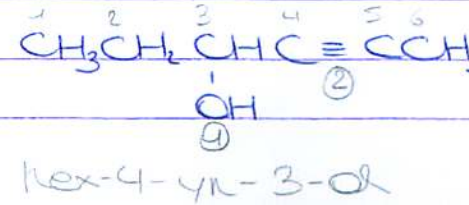
carbon-zuur

+ acetylide

$RC\equiv CH \xrightarrow[NH_3]{NaNH_2} RC\equiv C^-$

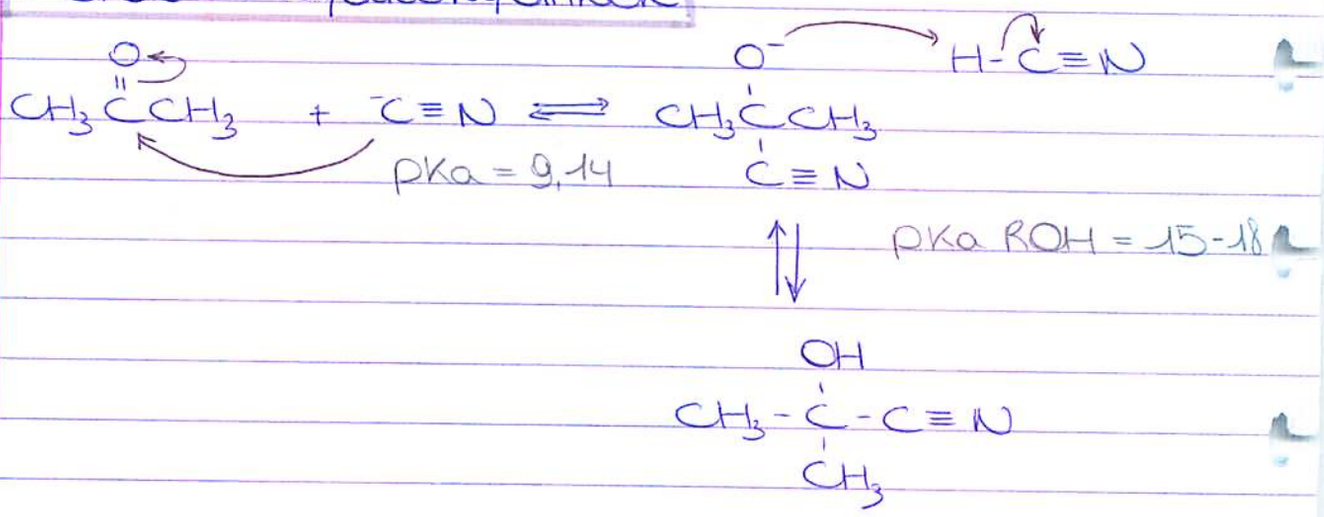
pka = ± 25





hex-4-yn-3-ol

Keton → cyaanhydrinen



+ $NaBH_4$ of $LiAlH_4$ (methode 2)

reductie

* $R-\underset{\underset{O}{\|}}{C}H \xrightarrow[2.H_2O]{1.NaBH_4} RCH_2OH$

aldehyde → primair alcohol

* $R-\underset{\underset{O}{\|}}{C}-R' \xrightarrow[2.H_2O]{1.NaBH_4} R-\underset{\underset{OH}{|}}{C}H-R'$

keton → secundair alcohol

opgelet ! $NaBH_4$ is minder reactief als $LiAlH_4$

Aldehyde / keton → alcohol

reductie

$CH_3CH_2\underset{\underset{O}{\|}}{C}H \xrightarrow[H_2]{Raney\ Ni} CH_3CH_2CH_2OH$ primair