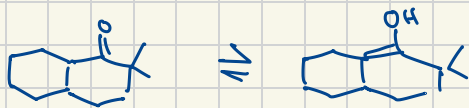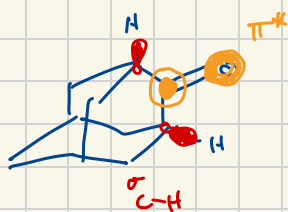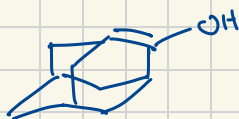1) To form the enolate we need to have an α-proton. It's C-H
bond must allow for overlap with the $\pi^*_{C=O}$ and the resulting
C=C must be stable

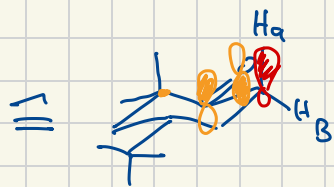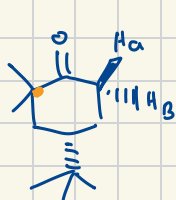$\Rightarrow$
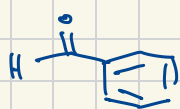
 does not have an α-proton

 does have α-protons. but they have no
overlap with $\pi^*_{C=O}$

 strained ring that does not comply with
Bredt's rule

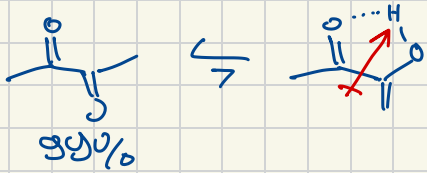2) Let's apply the same logic here

 $\rightleftharpoons$

Ha has good overlap

HB not

$\Rightarrow$ Ha more acidic
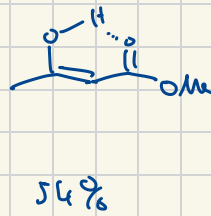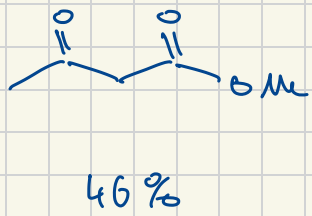
3) Here two things are important: ① Dipole ② H-Bonds
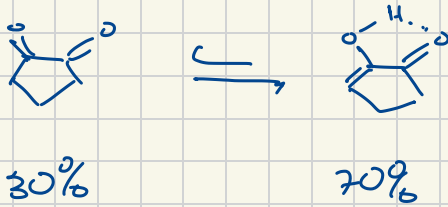

99%

Eq. on left bc with the formation of the H-Bond we create a large dipol.

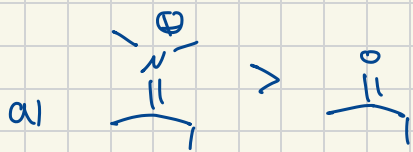46%   54%

- conjugated structure
- H-bond
- weaker dipol

30%   70%

forced cis conformation of α-diketones

4

a)   >   · bc charge is neutralized

b)   >
- amine better donor than alcohol
- ⊕ stabilized by methyl groups

5)
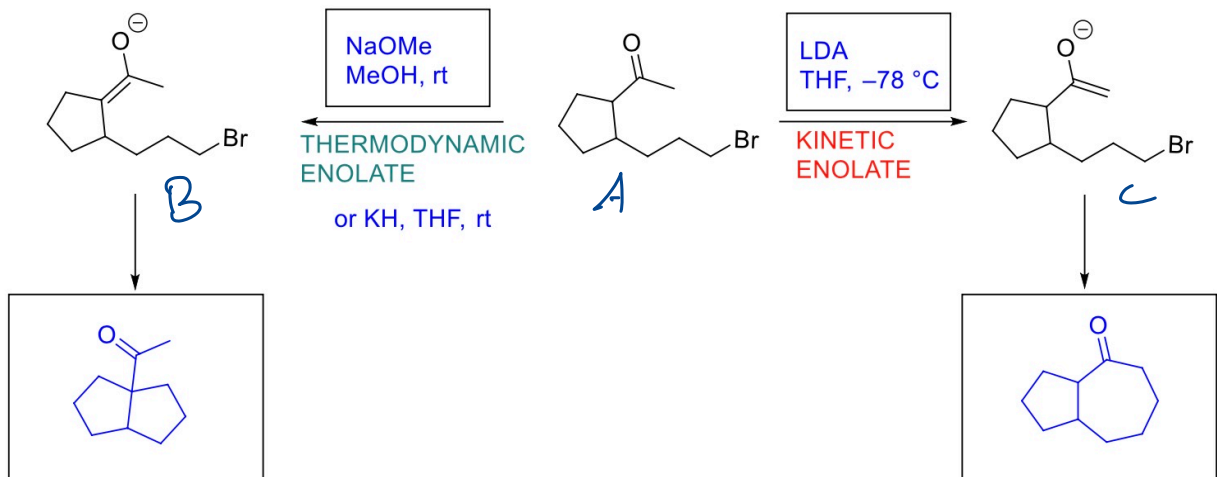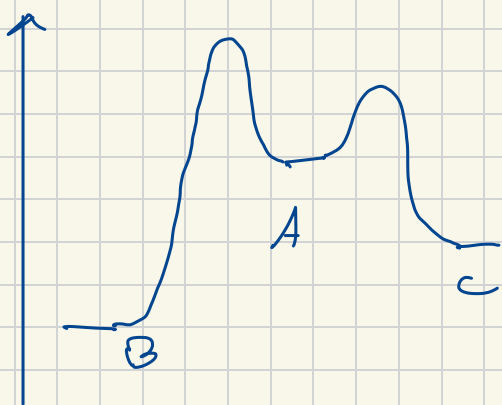
thermodynamic

- reversible enolate
- weak base
- forms more stable enolate

  ↓

  Saytzeff rule

more substituted DB
more stable

Kinetic

- irreversible, with strong base
- **Low temp**
- less stable enolate

* Deprotonation of more accessible α-proton

A

B

C

6)

a)

tBuOK (2.5 eq)

Br‿Bu (1 eq)

Br

+BuOH

+BuOH

SOK

Br‿N‿Br

– KBr

Br

+BuOK – tBuOH

SOK

– hBr

b)

NaOEt

– NaOEt

7

Top scheme:

A → 1. NaOEt, Et–I, EtOH → (intermediate) → 2. PhMgBr, Et₂O → [Ph, Ar, Ph, H, HO, Me] → 3. HCl, EtOH, 80 °C → B

Reagents and labels:

1. NaOEt, Et–I, EtOH

2. PhMgBr, Et₂O

$$\begin{array}{c} Ph \\ Ar \quad Ph \\ HO \quad H \\ Me \end{array}$$
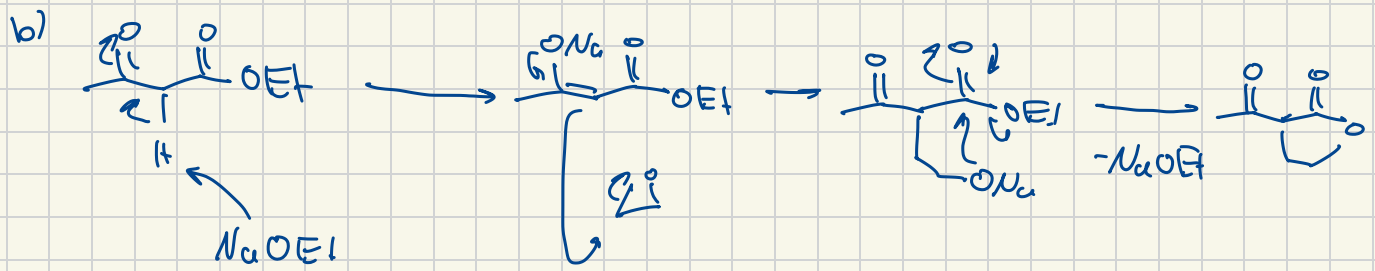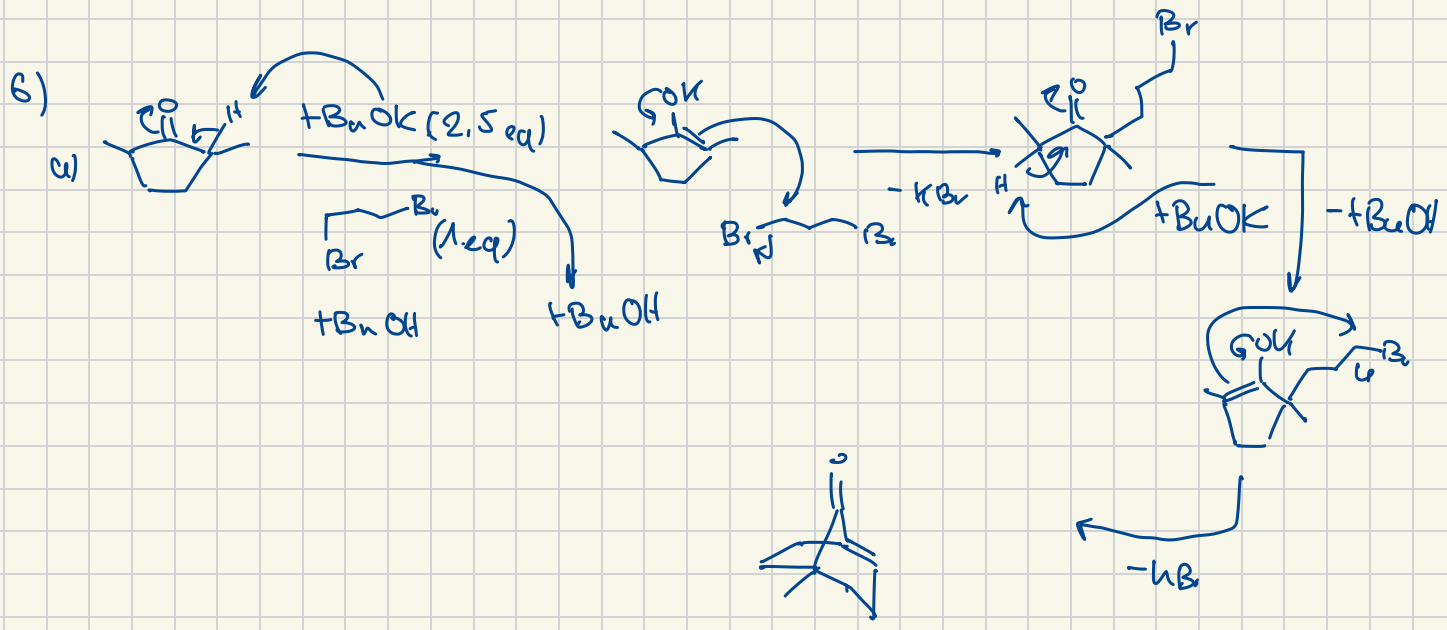
3. HCl, EtOH, 80 °C

A   **B**

Bottom mechanism:

1. NaOEt, Et–I, EtOH
2. PhMgBr, Et₂O
3. HCl, EtOH, 80 °C

HOEt   NaOEt

Na ⊕ ⊖ O — (enolate) Ph / Ar

—NaI

Ph–MgBr
then
work-up

$$\begin{array}{c} Ph \\ Ar \quad Ph \\ HO \\ H^+ \quad Me \end{array}$$

HCl,
EtOH,
80 °C

$$\begin{array}{c} Ph \\ Ar \quad Ph \\ H-O^+ \quad H \\ H \quad Me \end{array}$$

-H₂O

Product:
$$\begin{array}{c} Ar \\ Ph \quad Ph \\ Me \end{array}$$