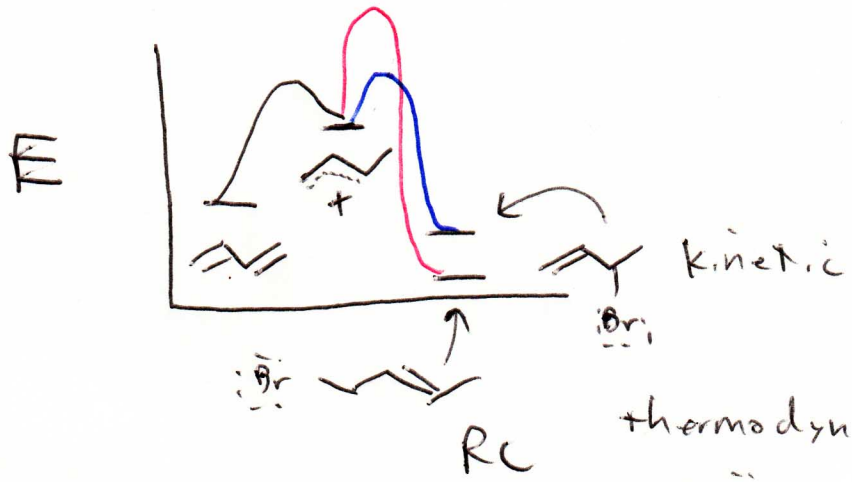
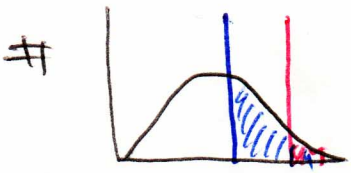




A B

A' + B'

166 °C kinetic

202 °C thermodynamic

only occurs if A' is ✓ kinetic product

$A' + B \longrightarrow A + B'$

$B' + A \longrightarrow NR$

↑ B' is thermo product

C_6H_{12}

↓

P.O.U = 1

ring or C=C

$\delta > 3 \Rightarrow$ alkene

δ 5.45, d t, 1H, J = 14 Hz

δ 5.42, dq, 1H, J = 14 Hz

δ 1.95, d, 2H

δ 1.643, d, 3H

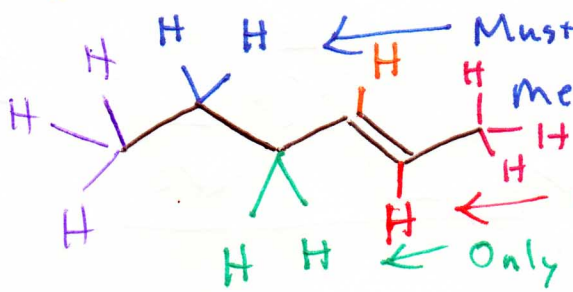
δ 1.360, tq, 2H

δ 0.885, t, 3H

Since J ≠ 0-3, the alkene must be internal, since only terminal alkenes have geminal splitting.

Approach: start w/ the methyl groups

0.88 δ, t, 3H δ<1 → likely far away from alkene



Must be δ 1.360, tq, 2H due to methyl group which causes quartet

Must be δ 5.42, dq, 1H, J = 14 Hz

Only one other peak w/ I ≥ 2; must be δ 1.95, dt, 2H

only one neighbor

must be an alkene since δ > 5 for all I = 1.

Since 5 carbons already used, methyl group is @ the end. Must have a triplet →

δ 5.45, dt, 1H, J = 14 Hz

C_5H_8O

⇓

D.O.U = 2

- C≡C
- C=C, ring
- C=O, ring
- C=C, C=O
- ring, ring

- δ 6.342, d, 1H, J = 6.2 Hz
- δ 4.664, dt, 1H, J = 6.2 Hz

δ 3.957, t, 2H

δ 1.984, dt, 2H

δ 1.846, tt, 2H

Based on δ and J, the compound appears to have an alkene,

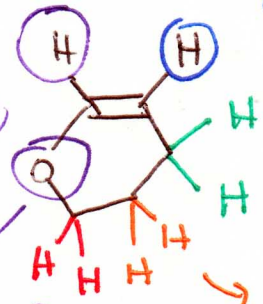
Since J ≈ 6, → cis alkene

δ 4.664, dt, 1H

δ 6.342, d, 1H

Since only a doublet, only one neighbor on one side

∴ must be C=O



Must have a doublet since there is, on one side, only one neighbor

→ δ 1.984, dt, 2H

→ δ 1.846, tt, 2H

or O

δ 3.957, t, 2H

C_5H_8O

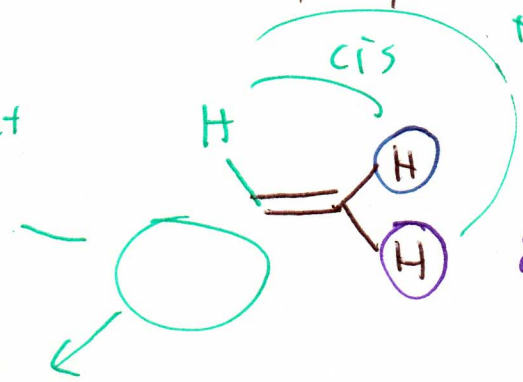
↓

2D.O.U.

- δ 6.34, dd, 1H, J_1 = ~~3.7~~ 8.7 Hz, J_2 = ~~17.5~~ 17.5 Hz
- δ 6.23, dd, 1H, J_1 = ~~6.23~~ 3.3 Hz, J_2 = 17.5 Hz
- δ 5.811, dd, 1H, J_1 = 3.3 Hz, J_2 = 8.7 Hz

δ 2.616, q, 2H geminal splitting!

δ 1.112, t, 3H



δ6.34, dd, 1H

no other neighbors

δ 5.811, dd, 1H, J_1 = 3.3 Hz, J_2 = 8.7 Hz

δ6.23, dd, 1H, J_1 = 3.3 Hz, J_2 = 17.5 Hz

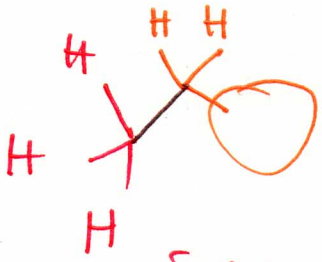
cis ↑ 8.7 Hz

↓ trans

must block splitting → O, C=O

δ 2.616, q, 2H

Since 4 carbons are used up, and since there must be one more carbon w/o hydrogens on it, that last carbon must be a carbonyl.



no splitting

δ 1.112, t, 3H