

Exam #4

This is an open-book, open notes exam. Show your work, so you can receive credit for correct parts of the final molecule.

1. (20 points) $C_9H_{12}O$

^{13}C NMR

156.9, s

130.8, s (2)

128.8, d (2)

123.7, d

59.5, q

16.0, q (2)

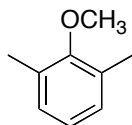
1H NMR

7.00, d, $J = 8.0$ Hz, 2H

6.85, t, $J = 8.0$ Hz, 1H

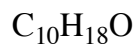
3.70, s, 3H

2.28, s, 6H



note 8.0 Hz ortho coupling constants

2. (40 points)



IR: 1735 cm^{-1}
MS: 170, 113

ester acyclic or six-membered ring or larger

^{13}C NMR

175.7, s

80.5, d

36.1, t

34.9, t

34.6, t

28.3, t

27.6, t

23.1, t

22.5, t

13.9, q

oxygenated methine

note: no symmetry

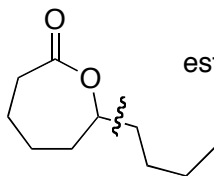
1H NMR

4.25, m, 1H

2.65, m, 2H

1.3 -1.9, m, 12H

0.92, t, $J = 7.2\text{ Hz}$, 3H





ester must be in a ring

alpha cleavage shows loss of 57 = C_4H_9

3. (40 points) $C_{14}H_{22}O$

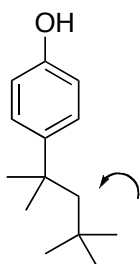
one OH

^{13}C NMR

152.7, s 
142.4, s  OH on
127.2, d (2) benzene ring
114.5, d (2)
59.4, t
37.9, s
32.2, s
31.7, q (2)
31.6, q (3)

1H NMR

7.22, d, $J = 7.9$ Hz, 2H 1,4-disubstituted benzene
6.75, d, $J = 7.9$ Hz, 2H
5.25, bs, 1H (exchanges)
1.71, s, 2H
1.33, s, 6H
0.72, s, 9H



isolated CH_2 not attached to benzene ring, since
1.71 in H NMR