

Chem 333 Organic Lab Lecture
Fall 2011
Exam #3
November 14, 2011

Name key

This is an open-book, open-notes exam. Please indicate your answer clearly.

1. (40 points)

$C_{13}H_{18}O_3$

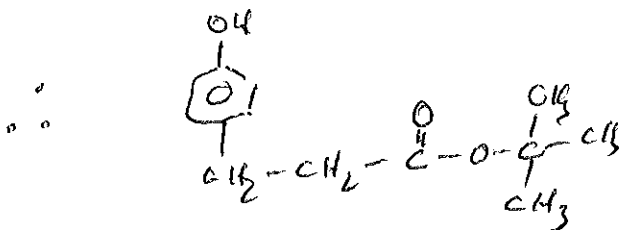
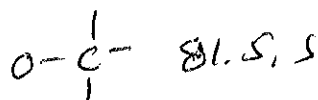
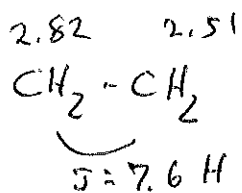
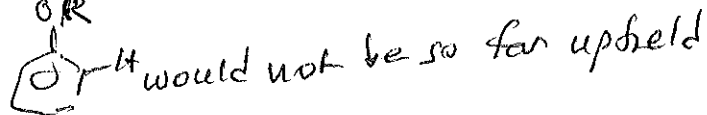
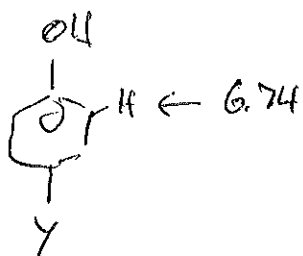
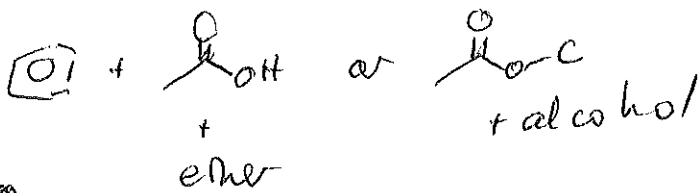
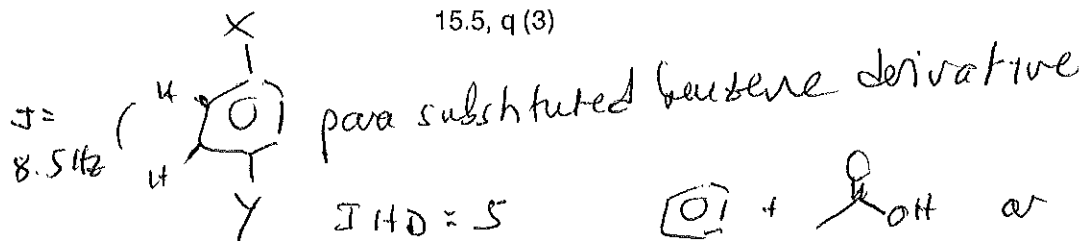
IR: 3400, 1740, 1601, 1516 cm^{-1}

^{13}C NMR

174.0, s
154.9, s
132.4, s
129.8, d (2)
115.8, d (2)
81.5, s
38.0, t
30.7, t
15.5, q (3)

1H NMR

7.05, bs, 1H (exchanges)
7.01, d, $J = 8.5$ Hz, 2H
6.74, d, $J = 8.5$ Hz, 2H
2.82, t, $J = 7.6$ Hz, 2H
2.51, t, $J = 7.6$ Hz, 2H
1.41, s, 9H



2. (40 points)

$C_{14}H_{20}O$

IR: 3302, 2928, 1602, 1492, 1443, 1034, 749, 696 cm^{-1}

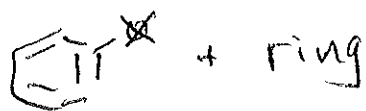
^{13}C NMR

139.4, s
129.5, d (2)
128.7, d (2)
126.5, d
77.0, d
43.3, d
40.9, t
29.5, t (2)
26.7, t (2)
26.3, t

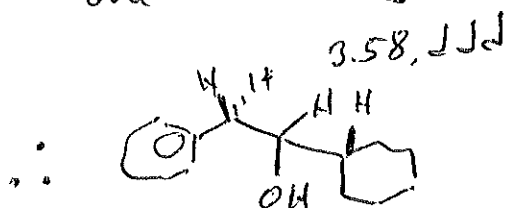
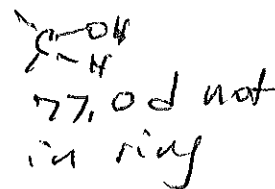
1H NMR

7.3, m, 5H
3.58, ddd, $J = 9.5, 8.9, 3.6$ Hz, 1H
2.89, dd, $J = 13.6, 3.6$ Hz, 1H
2.60, dd, $J = 13.6, 9.5$ Hz, 1H
1.91, bs, 1H (exchanges)
1.2-1.7, m, 11H

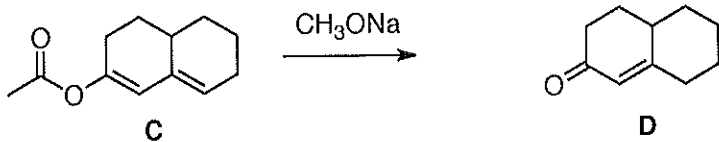
IHD = 5



19H on C \therefore OH, but not attached to benzene ring
one more ring 43.3 d symmetry so



3. (20 points) The diene **C** reacts quantitatively with sodium methoxide to give **D**. After addition of 1.0 mL of sodium methoxide in methanol to a 9.0 mL solution of **C** in methanol, the resulting solution showed $A = 1.20$ at 254 nm, and $A = 0.90$ at 280 nm. How much **C** (in milligrams) did the initial solution contain, and what was the molar concentration of the 1.0 mL of sodium methoxide solution that was added?



$$\epsilon_{254} = 900$$

$$1600$$

$$\epsilon_{280} = 1800$$

$$300$$

$$1.20 = 900C + 1600D$$

$$0.90 = 1800C + 300D$$

$$\therefore 1.50 = 2900D$$

$$D = 5.17 \times 10^{-4} \text{ M}$$

$$C = 4.13 \times 10^{-4} \text{ M}$$

$$\underline{9.30 \times 10^{-4} \text{ M in beginning}}$$

$$= 1.79 \text{ mg}$$

NaOCH_3 was $5.17 \times 10^{-4} \text{ M}$ in solution

so initial added was $5.17 \times 10^{-3} \text{ M}$