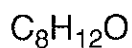


Chem 333 Organic Lab Lecture  
Fall 2011  
Exam #2  
October 24, 2011

Name key

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

1. (20 points)



IR: 2975, 2879, 2212, 1677, 1173  $cm^{-1}$

$C \equiv C$

$\gamma = 0$

$^{13}C$  NMR

$^1H$  NMR

1.  $IND = 3$

14  $\delta$  on  $C = 12$

188.8, s

2.55, q,  $J = 7.2$  Hz, 2H

94.1, s

2.35, t,  $J = 6.8$  Hz, 2H

80.8, s

1.6, m, 2H

38.8, t

1.14, t,  $J = 7.2$  Hz, 3H

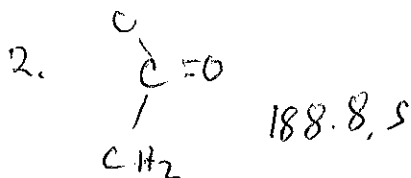
21.2, t

1.02, t,  $J = 7.6$  Hz, 3H

20.8, t

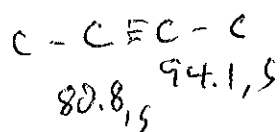
13.4, q

8.1, q



2.55, q,  $J = 7.2$  Hz, 2H

1.14, t,  $J = 7.2$  Hz, 3H

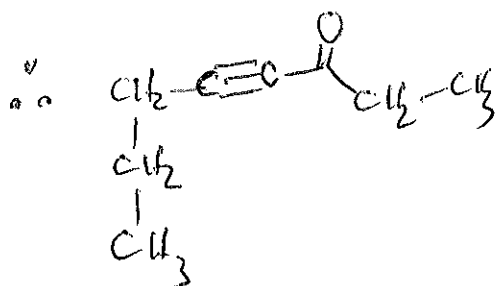


3. 1.02, t,  $J = 7.6$  Hz, 3H

4. a  $CH_3 - CH_2$

b.  $C \equiv C - CH_2$

2.35, t,  $J = 6.8$  Hz, 2H



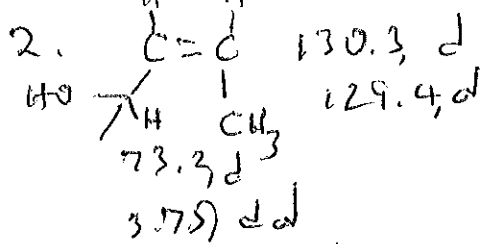
2. (40 points)

$C_{10}H_{18}O$

014  
IR: 3391, 2929, 1650, 1448, 1002, 967  $cm^{-1}$

1. RHD = 2

H's on C = 17  $\therefore$  OH  
5.72, dd  
5.47, dq, J = 15.2, 7.6 Hz

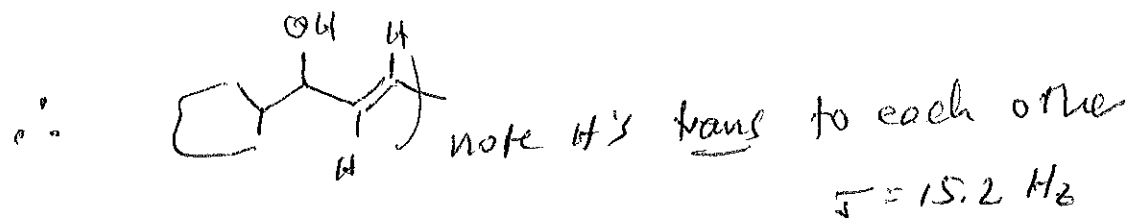
2.   
130.3, d  
129.4, d  
73.3, d  
29.3, t  
28.9, t (2)  
26.7, t (2)  
17.8, q

$^{13}C$  NMR

130.3, d  
129.4, d  
73.2, d  
42.3, d  
29.3, t  
28.9, t (2)  
26.7, t (2)  
17.8, q

$^1H$  NMR

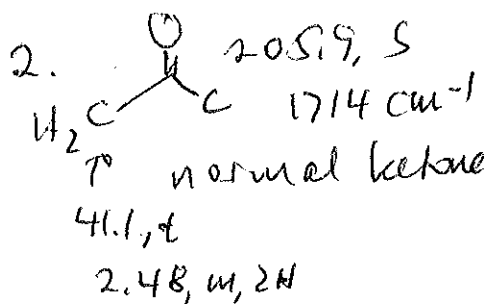
5.72, dd, J = 6.4, 15.2 Hz, 1H  
5.47, dq, J = 15.2, 7.6 Hz, 1H  
3.75, dd, J = 6.4, 7.2 Hz, 1H  
2.1, bs, 1H (exchanges)  
1.7, m, 5H  
1.65, d, J = 7.6 Hz, 3H  
1.3, m, 6H



3. (40 points)  $C_{11}H_{16}O_3$  IR: 2928, 2859, 1743, 1714, 1651, 1612, 1440, 1257, 1215  $cm^{-1}$

1. EHD = 4

H's on C = 16



$^{13}C$  NMR

205.9, s

172.8, s

137.6, d

117.7, t

62.7, d

51.3, q

41.1, t

40.6, d

31.4, t

28.9, t

25.2, t

$^1H$  NMR

5.75, ddt,  $J = 15.5, 11.2, 7.3$  Hz, 1H

5.0, m, 2H

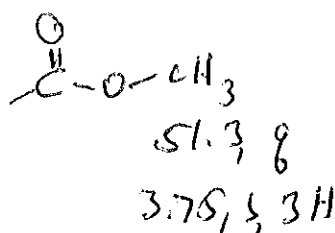
3.75, s, 3H

3.17, d,  $J = 11.0$  Hz, 1H

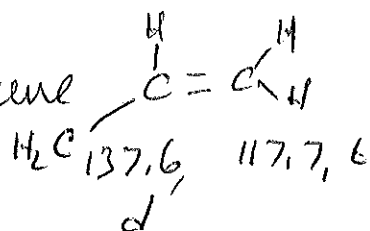
2.48, m, 2H

2.15, m, 2H



1.4-1.6, m, 5H



alkene



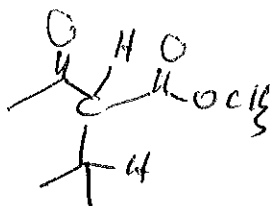
5.75, ddt

ring  two branches or 

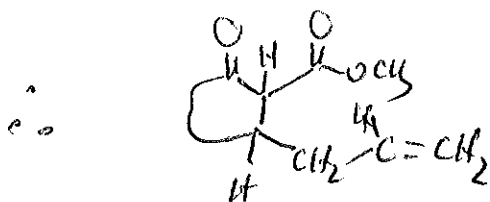
3. -

4. a -

b 3.17, d,  $J = 11.0$  Hz, 1H



ring can't be here - no symmetry



can't be

