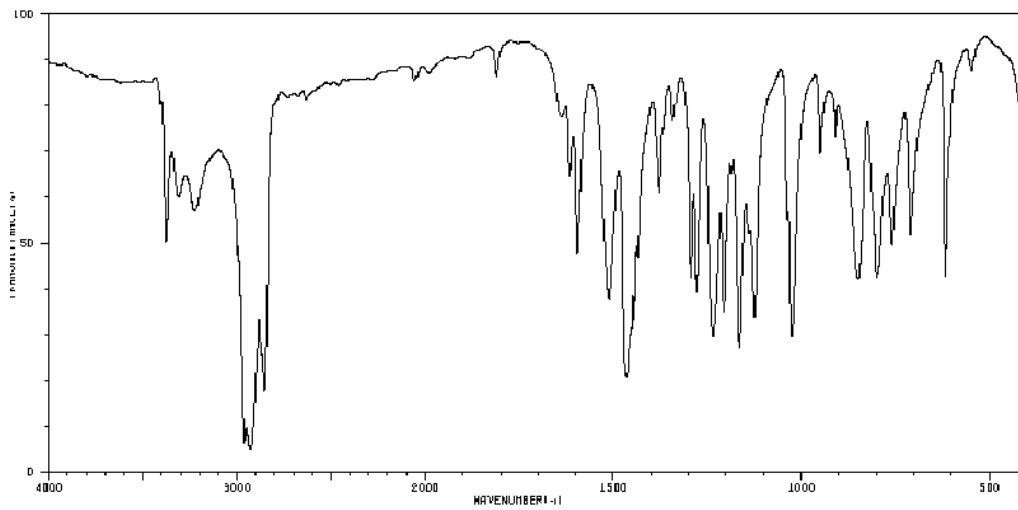


Extra problems for structure determination

Compound 1: $C_8H_{11}NO_2$

IR: 3310, 3226, 2960, 1639, 1278, 1124

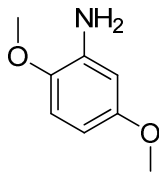


1H NMR

6.9 (d, 1H)
6.7 (d, 1H)
6.5 (s, 1H)
3.8 (s, 3H)
3.7 (s, 3H)
3.4 (s, 2H)

^{13}C NMR

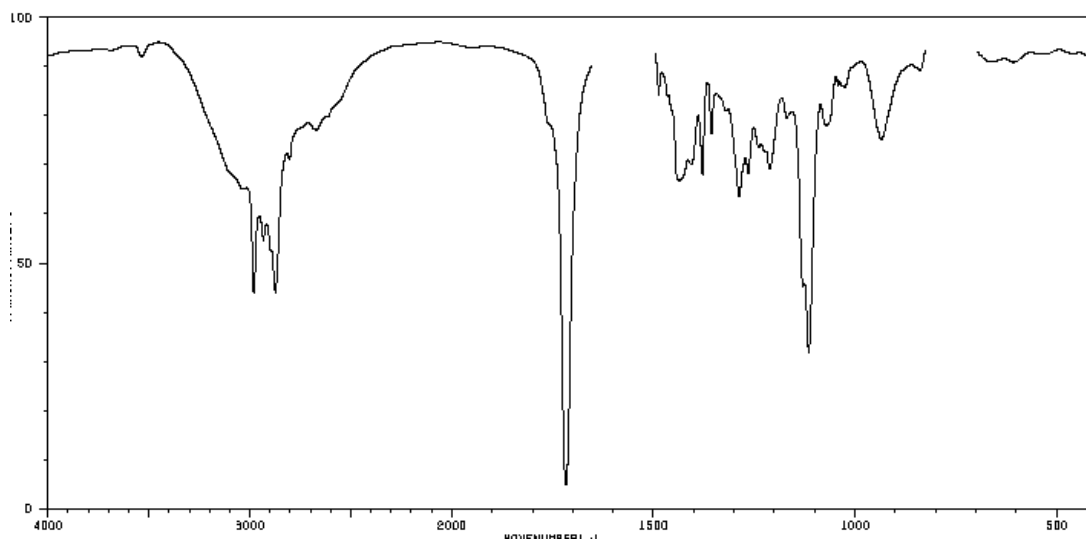
150
142
141
113
106
100
57
56



Chemical Formula: $C_8H_{11}NO_2$

Compound 2: C₅H₁₀O₃

IR: 2978, 2933, 1212, 1115 cm⁻¹

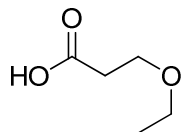


¹H NMR

11.2 (s, 1H)
3.7 (t, 2H)
3.5 (q, 2H)
2.6 (t, 2H)
1.1 (t, 3H)

¹³C NMR

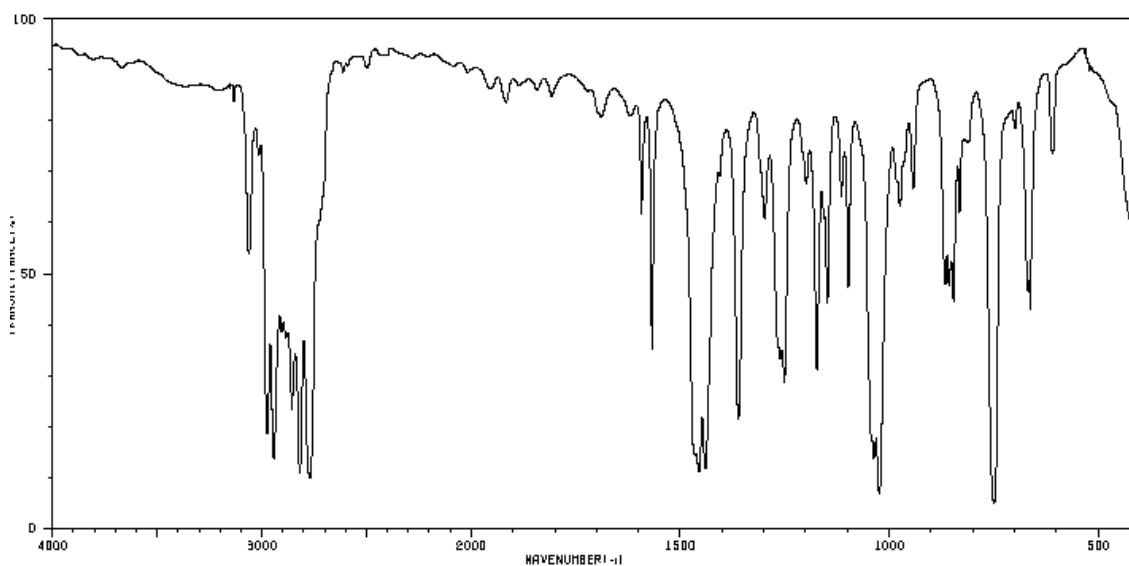
177
69
66
35
15



Chemical Formula: C₅H₁₀O₃

Compound 3. C₉H₁₂BrN

IR: 3062, 2975, 1667 cm⁻¹

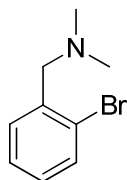


¹H NMR

7.5 (d, 1H)
7.3 (d of d, 1H)
7.2 (d, 1H)
7.0 (d of d, 1H)
3.5 (s, 2H)
2.3 (s, 6H)

¹³C NMR

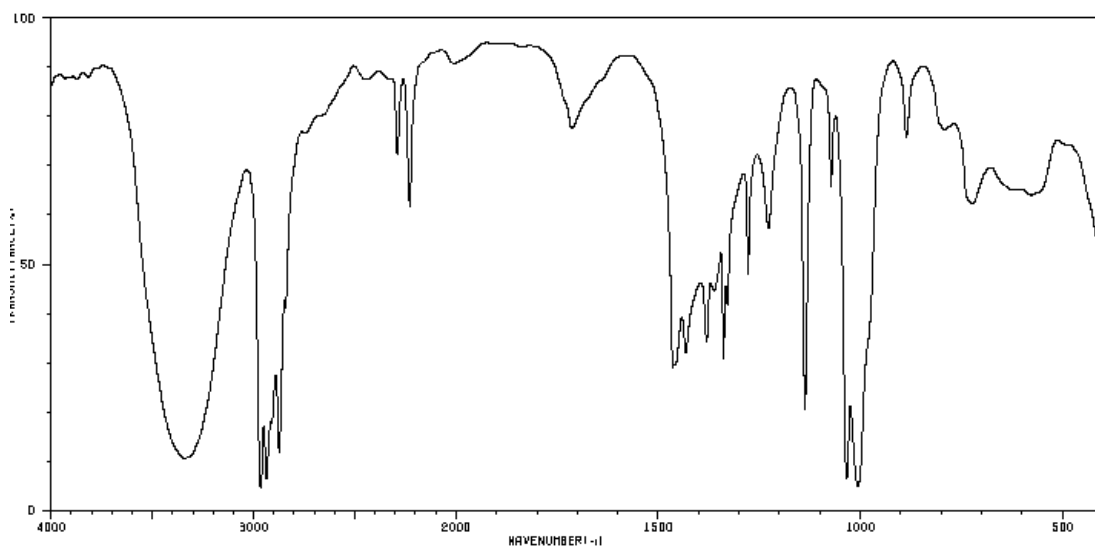
138
133
131
129
127
124
63
45



Chemical Formula: C₉H₁₂BrN

Compound 4: C₆H₁₀O

IR: 3348, 2964, 1054

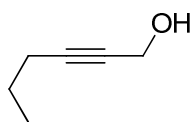


¹H NMR

4.2 (s, 2H)
2.9 (s, 1H)
2.1 (t, 2H)
1.5 (t of q, 2H)
1.0 (t, 3H)

¹³C NMR

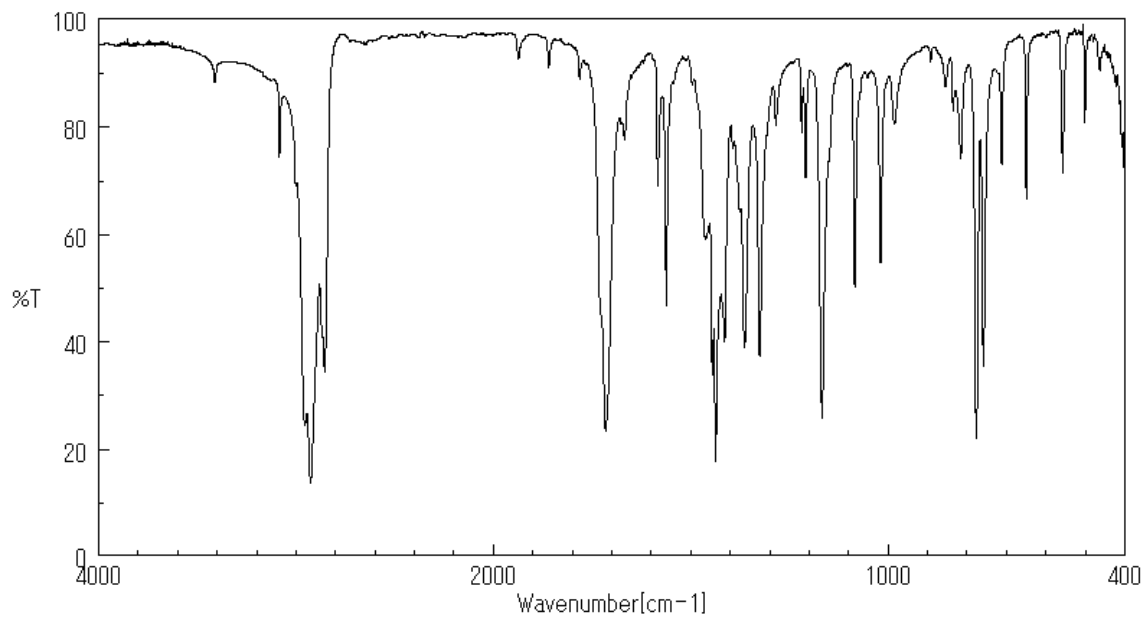
86
79
50
22
20
13



Chemical Formula: C₆H₁₀O

Problems 5: C₁₁H₁₁Cl₃O

IR 3011, 2984, 1751 cm⁻¹



¹H NMR

7.5 (s, 1H)

7.3 (s, 2H)

3.5 (s, 2H)

1.7 (s, 6H)

¹³C NMR

198

136

135

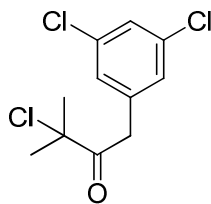
128

127

71

40

28



Chemical Formula: C₁₁H₁₁Cl₃O