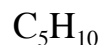
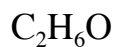


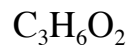
WORKSHOP for Chapter 13

Spectroscopy / Structure Determination

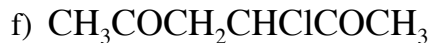
1. Identify compounds of the given molecular formula that show only one ^1H NMR signal:



2. Identify compounds of the given molecular formula that show only two ^1H NMR signals:



3. How many ^1H NMR signals will each of the following compounds show?



4. Deduce the unknown structures from the data presented.

a) C_4H_8O

triplet (1.0 ppm, 3H)

singlet (2.1 ppm, 3H)

quartet (2.4 ppm, 2H)

b) $C_4H_8O_2$

triplet (1.2 ppm, 3H)

singlet (2.1 ppm, 3H)

quartet (4.1 ppm, 2H)

c) C_8H_8O

singlet (2.4 ppm, 3H)

multiplet (7.5 ppm, 5H)

d) C_2H_5BrO

singlet (3.3 ppm, 3H)

singlet (4.9 ppm, 2H)

e) C_4H_9Br

doublet (1.1 ppm, 6H)

multiplet (1.9 ppm, 1H)

doublet (3.4 ppm, 2H)

f) $C_4H_8O_3$

triplet (1.3 ppm, 3H)

quartet (3.7 ppm, 2H)

singlet (4.2 ppm, 2H)

singlet (11.0 ppm, 1H)

g) C_3H_7ClO

triplet (1.4 ppm, 3H)

quartet (3.8 ppm, 2H)

singlet (5.6 ppm, 2H)

h) $C_6H_{12}O_2$

singlet (1.2 ppm, 6H)

singlet (2.1 ppm, 3H)

singlet (2.8 ppm, 2H)

singlet (3.7 ppm, 1H)