



### Topic 20 Exercise 3 – proton nmr spectra

1. A compound with molecular formula  $C_3H_6O_2$  gives the following peaks in its proton nmr spectrum:

Chemical shift	Splitting	Integration factor
1.1	Triplet	3
2.2	Quartet	2
11.8	Singlet	1

Identify the molecule and account for the chemical shifts, splitting and integration factors of all three peaks.

2. A compound with molecular formula  $C_5H_{10}O_2$  gives the following peaks in its proton nmr spectrum:

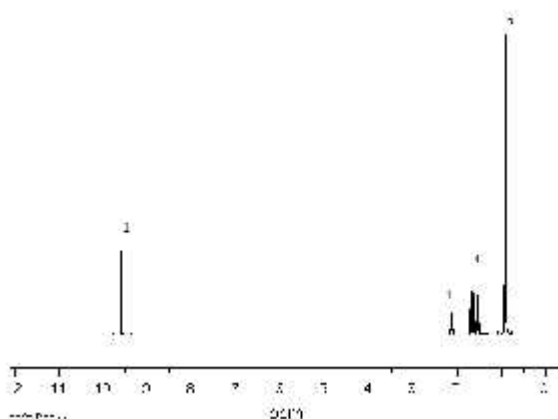
Chemical shift	Splitting	Integration factor
1.2	Triplet	3
1.3	Triplet	3
2.3	Quartet	2
4.1	Quartet	2

- Identify the molecule and account for the chemical shifts, splitting and integration factors of all four peaks.
  - Explain why  $CH_2Cl_2$  is not used as a solvent in proton nmr spectroscopy.
  - Give three reasons why T.M.S. is a good standard in proton nmr spectroscopy.
3. Use the information in the table below to identify molecule A from its proton nmr spectrum.

peak	chemical shift/ppm	relative intensity	peak type
a	2.4	1	multiplet
b	2.1	3	Singlet
c	1.5	2	multiplet
d	1.1	3	doublet
e	0.9	3	triplet

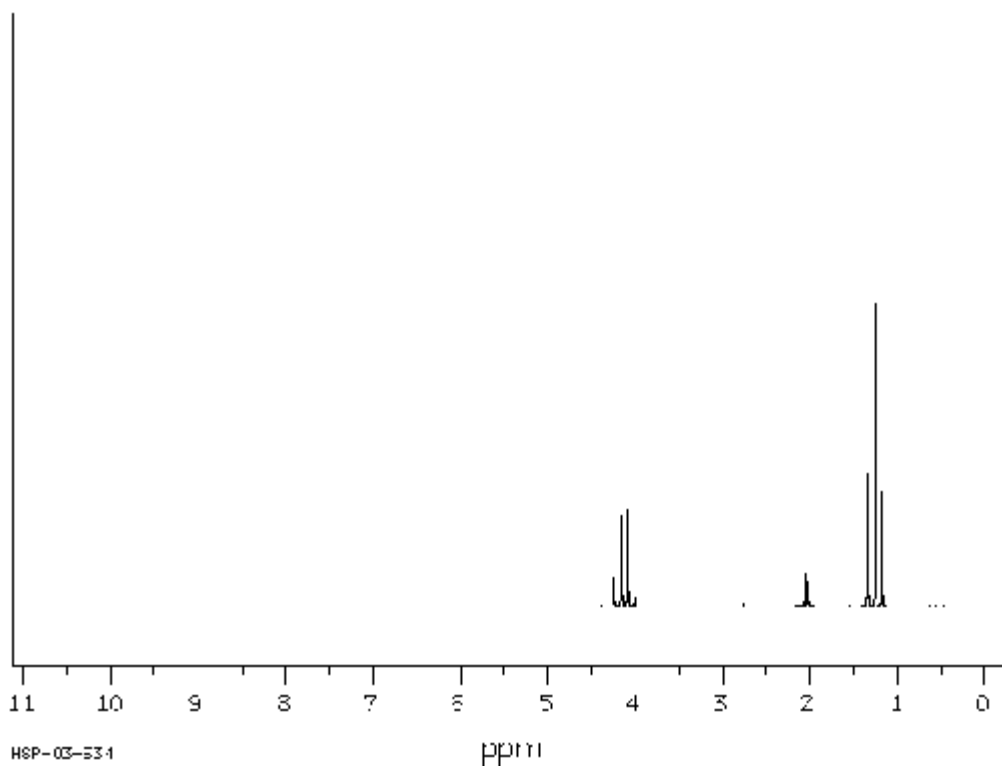
**MEGA LECTURE**

4. Identify the molecule responsible for the proton nmr spectrum below:



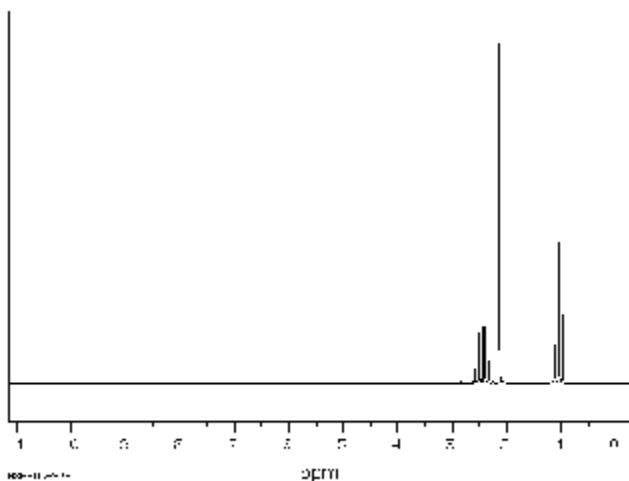
The peak at 9.6 is a doublet; the peak at 2.1 is a multiplet; the peak at 1.7 is a multiplet and the peak at 0.9 is a triplet

5. Identify this molecule:



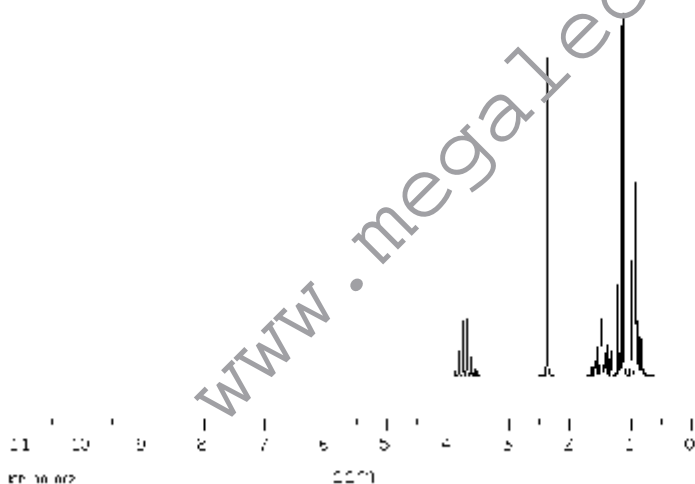
Shift	Relative peak intensity	Splitting
4.1	2	Quartet
2.1	3	Singlet
1.3	3	Triplet

6. Identify this molecule:



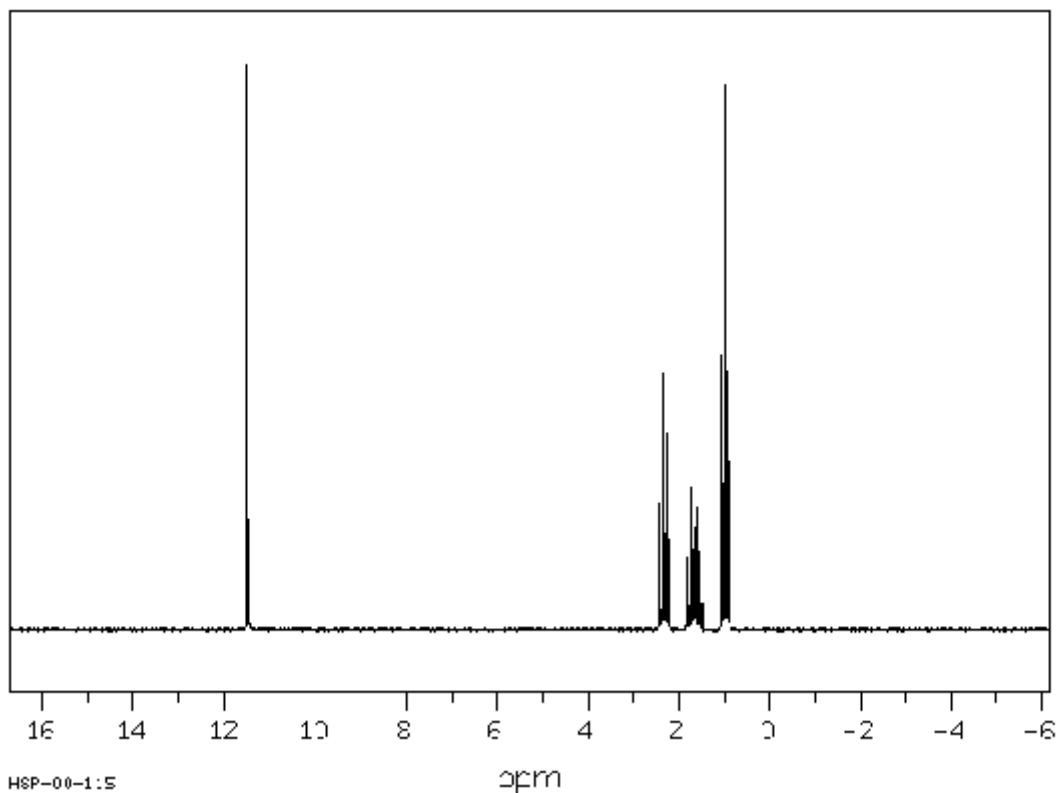
Shift	Relative peak intensity	Splitting
2.4	2	Quartet
2.2	3	Singlet
1.1	3	Triplet

7. Identify this molecule:



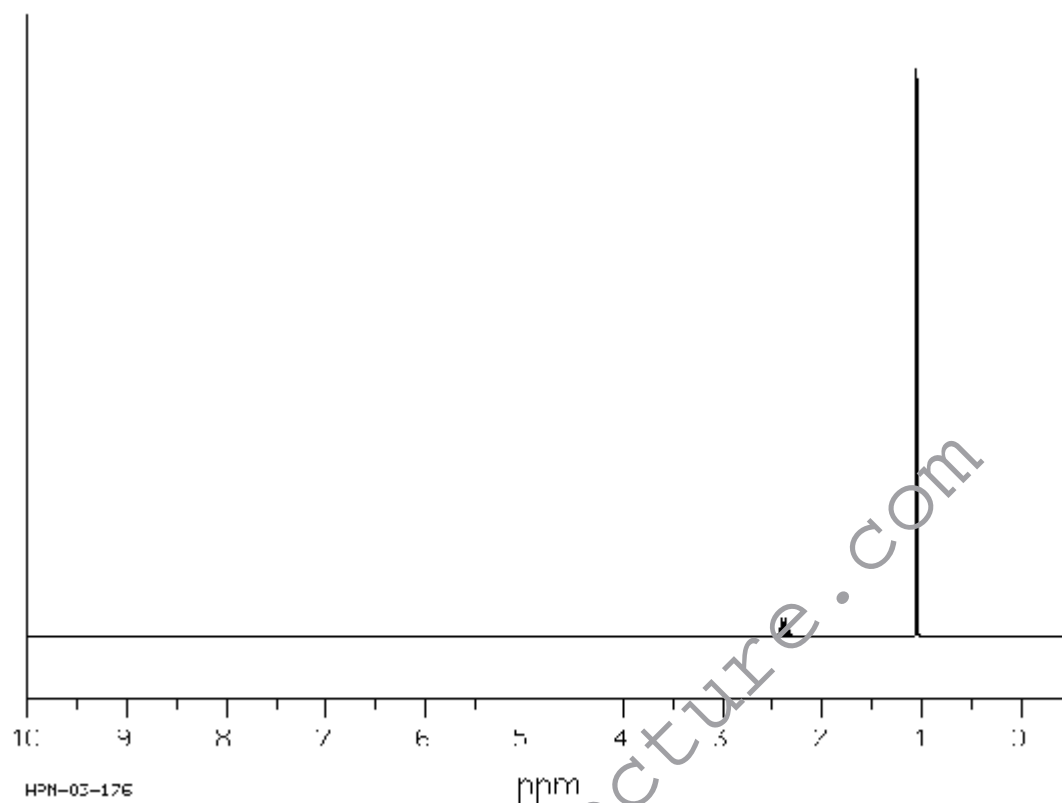
Shift	Relative peak intensity	Splitting
3.6	1	Multiplet
2.3	1	Singlet
1.4	2	Multiplet
1.2	3	Doublet
0.9	3	Triplet

8. Identify this molecule:



Shift	Relative peak intensity	Splitting
11.6	1	Singlet
2.2	2	Triplet
1.9	2	Multiplet
1.0	3	Triplet

9. Identify this molecule:



Shift	Relative peak intensity	Splitting
9.6	1	Doublet
2.3	1	Multiplet
1.1	6	Doublet