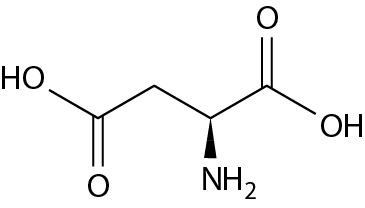
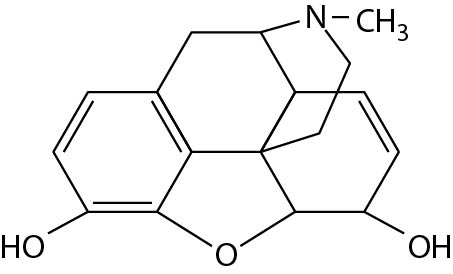
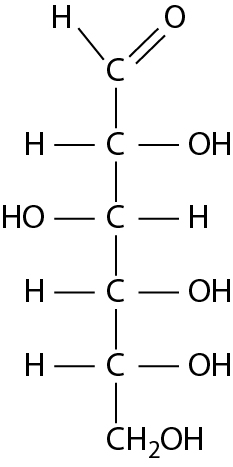
Name Date

Worksheet 11.1: Introduction to organic chemistry and analytical techniques

**1** Draw the structural formulas for the following compounds:

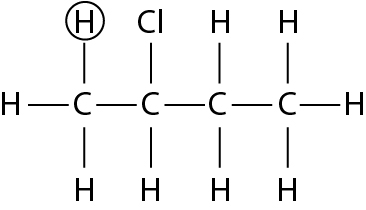
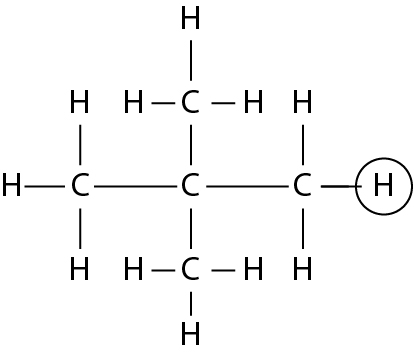
1. 2-bromo-2-methylbutane
2. 3-methylbutan-2-ol
3. pentan-3-one
4. ethanedioic acid
5. cyclopentene
6. 1,3-diaminobenzene

**2** Identify as many functional groups as you can in the following compounds:

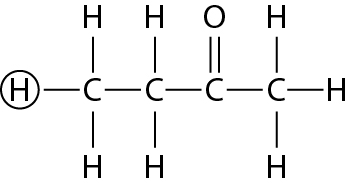
1. 
2. 
3. 

**3** State the splitting pattern for H circled in each of the following molecules:



1. 
2. 

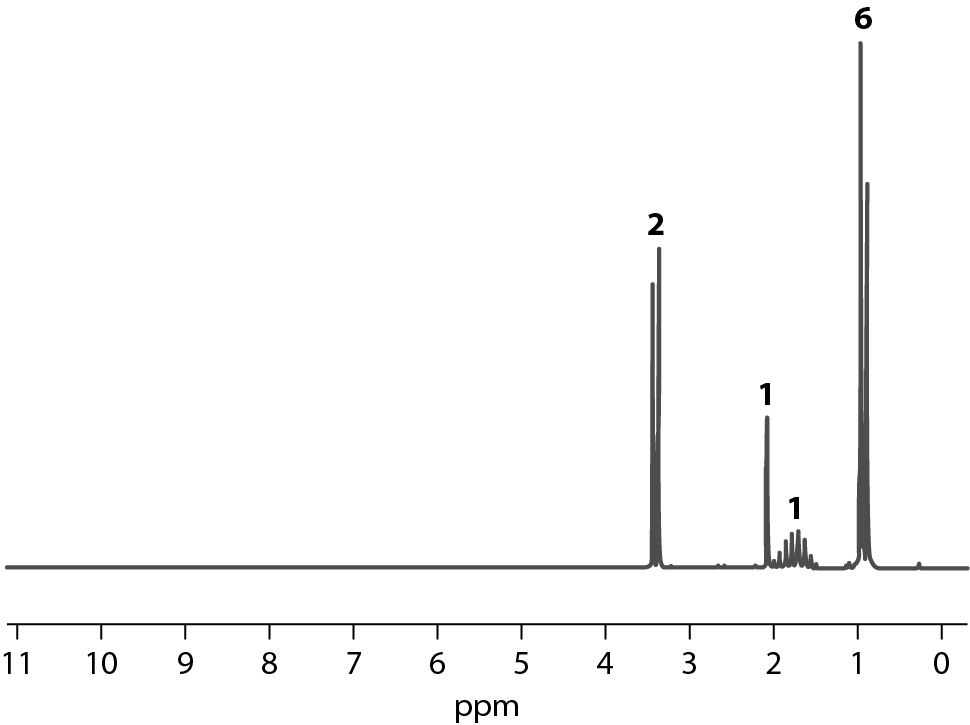


1. 

**4** Identify the organic compounds shown in the following 1H NMR spectra. Explain how you arrived at your answers by referencing to i) the number of H environments in the molecule; ii) the types of H environments; iii) the relative numbers of H in each environment; and iv) the numbers of H on adjacent C atoms. You may use the table to help organise the information from each spectrum.

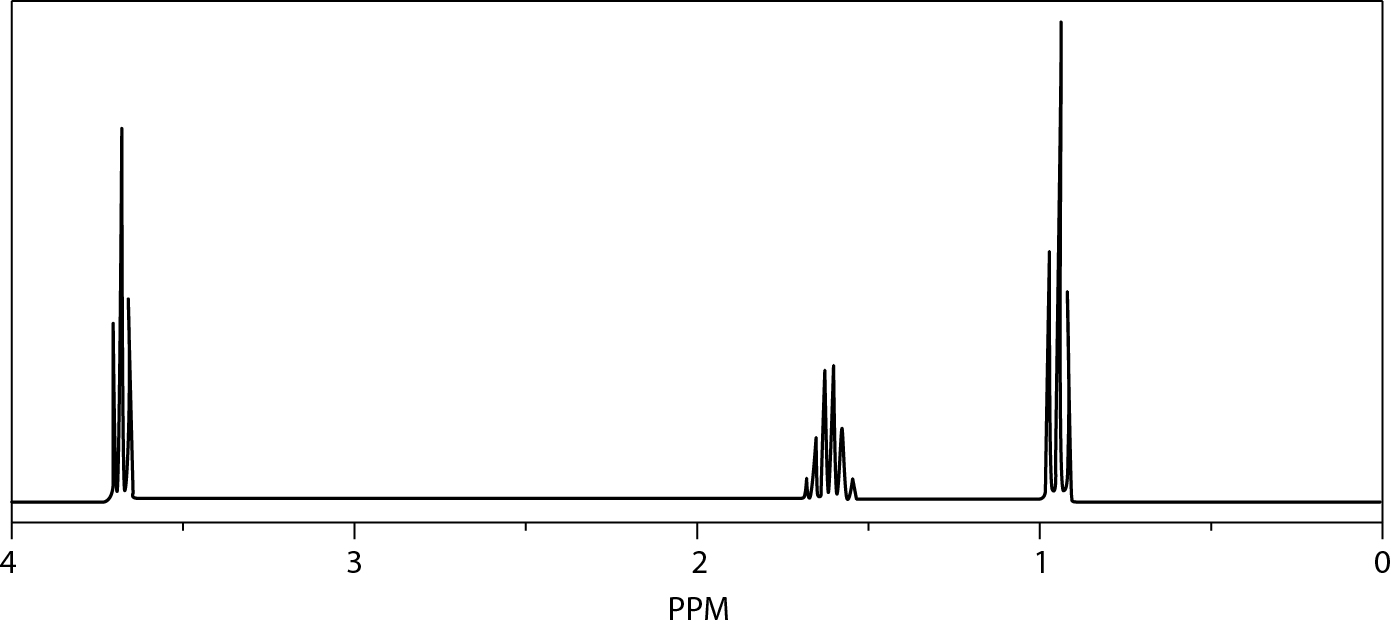
|  |  |
| --- | --- |
| **What to look for in the NMR spectrum** | **Information on the compound** |
| Number of different H environments (= number of peaks) |  |
| Types of H environments (using the chemical shift of each peak and check with the data book; remember some of the ranges are broad and the value of chemical shift can change sometimes, depending on the adjacent chemical environments) |  |
| Relative numbers of H in each environment (using the integration traces) |  |
| Number of H atoms on adjacent C atoms (look at splitting pattern, number of peaks = number of adjacent H + 1) |  |

1. This molecule is an alcohol.





1. This molecule can be formed in a free radical substitution reaction using chlorine.



1. This molecule can be formed in a condensation reaction between an alcohol and a carboxylic acid.

