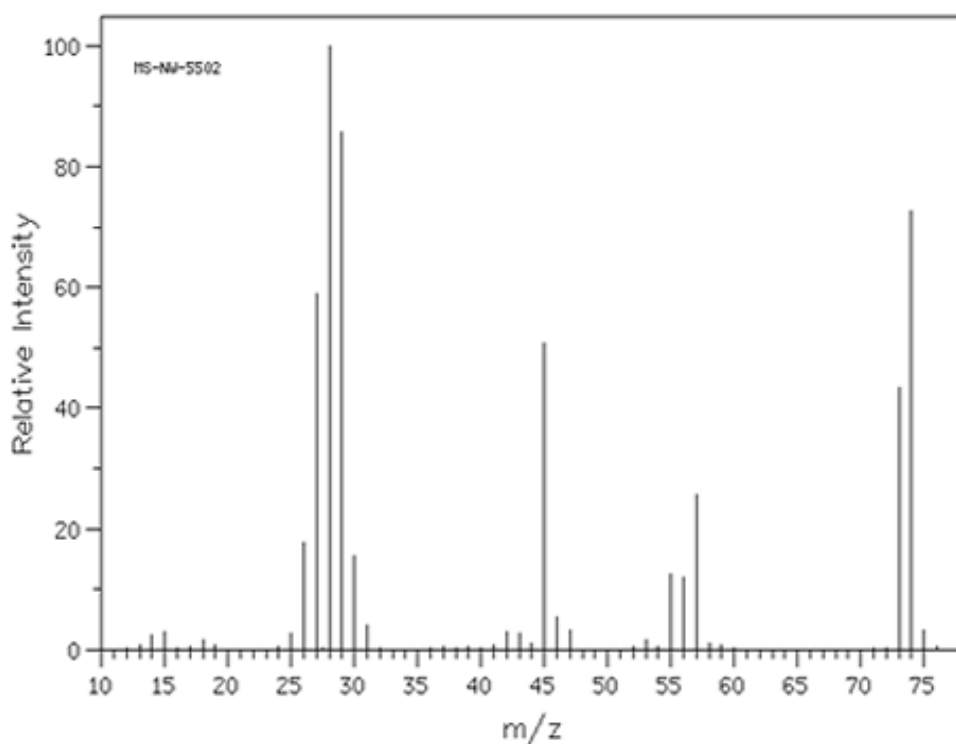


Friday Worksheet
Mass spectroscopy 1

Name:

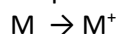
- 1) The most appropriate technique to determine the number of isotopes of Pb is
 - a) mass spectrometry.
 - b) infrared spectroscopy.
 - c) atomic absorption spectroscopy.
 - d) high-performance liquid chromatography.Explain why
- 2) The most appropriate technique to determine the concentration of Hg^{2+} ions in blood is
 - a) mass spectrometry.
 - b) infrared spectroscopy.
 - c) atomic absorption spectroscopy.
 - d) high-performance liquid chromatographyExplain why.
- 3) Consider the mass spectrum below of an organic acid.



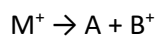
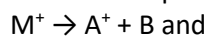
- a) Define the following
 - i) m/z
 - ii) Base peak
 - iii) Parent ion peak
- b) What is the molar mass of this molecule?
- c) Identify the organic molecule from the information given in the spectrum.
- d) What fragment is represented by the peak at 45(m/z)
- e) What is the most common fragment
- f) What is the molecular formula of the compound if its empirical formula is $\text{C}_3\text{H}_6\text{O}_2$

4) A sample of compound M is analysed in a mass spectrometer where it forms the molecular ion M⁺

a) Write an equation to represent the ionisation of M



Some of the parent ions fragment as follows.



b) If the molar mass of M is 29 and the molar mass of B is 14 the mass spectrum would show peaks at which m/z values?

c) Which of the following will not appear on the spectrum? Explain

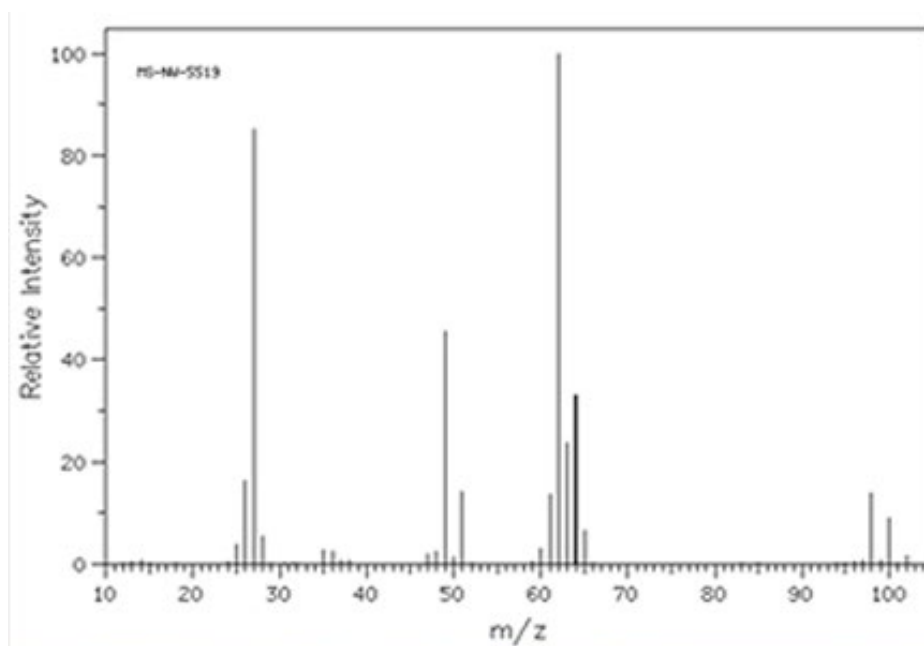
M, A, A⁺, B or B⁺

5) 2-methylbutane is analysed using a mass spectrometer.

a) What is the highest m/z value that a peak could be expected?

b) A peak at m/z 57 is noticed. This is most likely caused by which fragment?

6) Below is a the MS of 1,2-dichloroethane.



a) What is the most common fragment?

b) Chlorine has two isotopes ³⁵Cl and ³⁷Cl. Looking at the spectrum, what fragments formed the last three peaks on the right?