

Atomic structure ( 2.2 The Mass Spectrometer)

Name:.....

Date:.....

1. Describe briefly how in the mass spectrometer

a. the atoms are converted into ions.

.....  
.....

b. the ions of different mass are separated.

.....  
.....

c. the ions are detected.

.....  
.....

2. Germanium (atomic number 32) contains 20% germanium-70, 27% germanium-71, 8% germanium-72, 37% germanium-73 and 8% germanium-74. Draw a graph of the mass spectrum that you would expect germanium to produce. If an atom of germanium-70 lost two electrons to become a doubly charged ion, at what m/z would it appear?

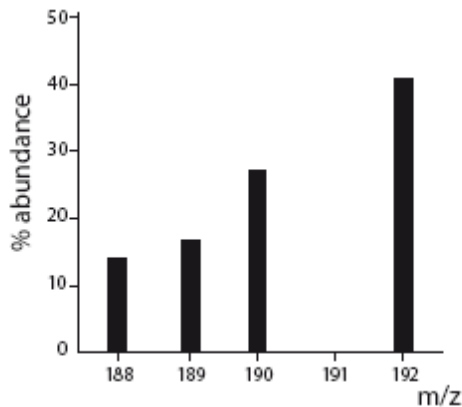
3. The graph shows the mass spectrum of the element which contains 76 protons in its nucleus.

a. Write down in the form  ${}^A_Z X$  the isotopes that it is composed of with their natural abundances (as %)

.....  
.....  
.....  
.....

b. Calculate the relative atomic mass of the element.

.....  
.....



4. Lead has a molar mass of 207.2 g mol<sup>-1</sup>. Assuming that it is composed entirely of <sup>206</sup>Pb, <sup>207</sup>Pb and <sup>208</sup>Pb, and that the percentages of the two lightest isotopes are equal, calculate the relative percentages of these isotopes in the natural element.

.....  
.....  
.....  
.....