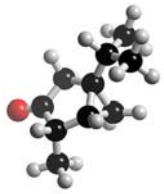
1.1 – ATOMIC STRUCTURE – PPQ3



Name …… Form ……

3) A sample of iron from a meteorite was found to contain the isotopes ^{54}Fe, ^{56}Fe and ^{57}Fe.

a) The relative abundances of these isotopes can be determined using a mass spectrometer. In the mass spectrometer, the sample is first vaporised and then ionised.

i) State what is meant by the term *isotopes*. ……

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ii) Explain how, in a mass spectrometer, ions are detected and how their abundance is measured.

How ions are detected ……

.....

How abundance is measured .....

..... (5)

b) i) Define the term *relative atomic mass* of an element. ……

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ii) The relative abundances of the isotopes in this sample of iron were found to be as follows.

m/z	54	56	57
Relative abundance (%)	5.8	91.6	2.6

Use the data above to calculate the relative atomic mass of iron in this sample. Give your answer to one decimal place.

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..... (4)

c) i) Give the electron arrangement of an Fe^{2+} ion.

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ii) State why iron is placed in the d block of the Periodic Table.

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iii) State the difference, if any, in the chemical properties of isotopes of the same element. Explain your answer.

Difference .....

Explanation .....

..... (4)