

Exam question section

1 (a) Complete the following table.

Name of particle	Relative mass	Relative charge
	5.45×10^{-4}	
		+1
		0

6 marks

(b) Give the meaning of the term *mass number*.

_____ 1 mark

(c) In terms of the numbers of fundamental particles, explain the difference between two isotopes of the same element.

_____ 2 marks

(d) Give the full chemical symbol for the isotope that has seven electrons and six neutrons in one atom.

_____ 2 marks

(e) Give the number of protons, neutrons and electrons in the ion $^{31}\text{P}^{3-}$

_____ 3 marks

(f) Give the full electronic configuration, including sub-shells, of the following species.

(i) Mg^{2+} _____

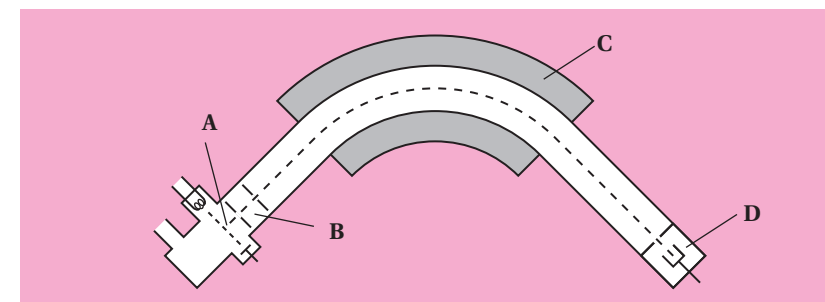
(ii) Cr _____

(iii) S^{2-} _____

(iv) Fe^{2+} _____ 4 marks

Total marks: 18

2 A diagram of a mass spectrometer is shown below.



(a) Name the process that happens in region A and explain how it is achieved.

Name of process _____

Explanation _____

_____ 3 marks

(b) State the function of the part of the mass spectrometer labelled B and explain its action.

Function _____

Explanation _____

_____ 3 marks

(c) C is a powerful electromagnet. Explain the function of this electromagnet.

_____ 2 marks

(d) State the property that the detector, D, can measure and explain how the detector works.

Property measured _____

Explanation _____

_____ 3 marks

(e) Explain why the spectrometer is able to detect particles with different m/z values.

_____ 3 marks

Total marks: 14