Q1.   (a)   Complete the following table.

	Relative mass	Relative charge
Proton		
Electron		

(2)

(b)   An atom of element **Q** contains the same number of neutrons as are found in an atom of ^{27}A1. An atom of **Q** also contains 14 protons.

(i)   Give the number of protons in an atom of ^{27}A1.

....

(ii)   Deduce the symbol, including mass number and atomic number, for this atom of element **Q**.

....

(3)

(c)   Define the term *relative atomic mass* of an element.

....

....

(2)

(d)   The table below gives the relative abundance of each isotope in a mass spectrum of a sample of magnesium.

m/z	24	25	26
Relative abundance (%)	73.5	10.1	16.4

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

....

....

....

(2)

(e) State how the relative molecular mass of a covalent compound is obtained from its mass spectrum.

....

....

(1)
(Total 10 marks)

Q2. (a) Complete the following table.

Particle	Relative charge	Relative mass
Proton		
Neutron		
Electron		

(3)

(b) An atom of element **Z** has two more protons and two more neutrons than an atom of $^{34}_{16}S$. Give the symbol, including mass number and atomic number, for this atom of **Z.**

....

(2)

(c) Complete the electronic configurations for the sulphur atom, S, and the sulphide ion, S^{2} .

S $1s^2$ ....

S^{2} $1s^2$ ....

(2)

(d)   State the block in the Periodic Table in which sulphur is placed and explain your answer.

Block ....

Explanation ....

(2)

(e)   Sodium sulphide, Na_2S, is a high melting point solid which conducts electricity when molten. Carbon disulphide, CS_2, is a liquid which does not conduct electricity.

(i)   Deduce the type of bonding present in Na_2S and that present in CS_2

Bonding in Na_2S ....

Bonding in CS_2 ....

(ii)   By reference to all the atoms involved explain, in terms of electrons, how Na_2S is formed from its atoms.

....

....

(iii)   Draw a diagram, including all the outer electrons, to represent the bonding present in CS_2

(iv)   When heated with steam, CS_2 reacts to form hydrogen sulphide, H_2S, and

carbon dioxide.
Write an equation for this reaction.

....

(7)
(Total 16 narks)

Q3. (a) State the relative charge and relative mass of a proton, of a neutron and of an electron.
In terms of particles, explain the relationship between two isotopes of the same element.
Explain why these isotopes have identical chemical properties.

(7)

(b) Define the term *relative atomic mass*. An element exists as a mixture of three isotopes.
Explain, in detail, how the relative atomic mass of this element can be calculated from data obtained from the mass spectrum of the element.

(7)
(Total 14 marks)

Q4. An atom in which the number of protons is greater than the number of neutrons is

A ^{234}U

B ^{6}Li

C ^{3}He

D ^{2}H

(Total 1 mark)