Paper 3

Questions are applicable for both core and extended candidates

1 This question is about sulfur and compounds of sulfur.

(a) Sulfur has several isotopes.

Define the term isotopes.

.....

..... [2]

(b) Deduce the number of protons, neutrons and electrons in the sulfide ion shown.

$^{36}_{16}S^{2-}$

number of protons .....

number of neutrons .....

number of electrons .....

[3]

2 This question is about metals.

(c) Deduce the number of electrons and neutrons in one atom of the isotope of nickel shown.

$^{62}_{28}Ni$

number of electrons .....

number of neutrons .....

[2]

Paper 4

Questions are applicable for both core and extended candidates unless indicated in the question

3 **(a)** Atoms are made of protons, neutrons and electrons. Atoms of the same element are known as isotopes.

(ii) $^{24}_{12}Mg$ and $^{25}_{12}Mg$ are isotopes of magnesium.

Complete the table to show the numbers of electrons, neutrons and protons in these isotopes of magnesium.

isotope	number of electrons	number of neutrons	number of protons
$^{24}_{12}Mg$			
$^{25}_{12}Mg$			

[2]

4 **(b)** Boron, B, has two isotopes.

(i) State the meaning of the term isotopes.

.....

..... [2]

(ii) Table 2.1 shows the relative masses and the percentage abundances of the two isotopes of boron.

Table 2.1

relative mass of isotope	percentage abundance of isotope
10	20
11	80

Calculate the relative atomic mass of boron to **one** decimal place. **(extended only)**

relative atomic mass = ... [2]

5 Lithium, sodium and potassium are Group I elements.

(c) Lithium has two naturally occurring types of atoms, ^{6}Li and ^{7}Li.

(iii) Table 2.2 shows the relative abundance of the two naturally occurring atoms of lithium.

Table 2.2

atom	^{6}Li	^{7}Li
relative abundance	10%	90%

Calculate the relative atomic mass of lithium to **one** decimal place. **(extended only)**

relative atomic mass = ... [2]

6 Boron and aluminium are Group III elements.

(a) Boron has only two naturally occurring isotopes, ^{10}B and ^{11}B.

Complete Table 2.1 to show the numbers of protons, neutrons and electrons in an atom of ^{11}B.

Table 2.1

number of protons	number of neutrons	number of electrons

[2]

(b) The relative atomic mass of boron to one decimal place is 10.8.

(i) Determine the relative abundance of ^{10}B present in boron. Give your answer as a percentage. **(extended only)**

..... % [1]