Questions are for both separate science and combined science students unless indicated in the question

Q1.

Copper is extracted from metal ores.

Chalcopyrite is a metal ore containing a compound with the formula $CuFeS_2$

(a) $CuFeS_2$ reacts with oxygen to produce copper(II) sulfate and iron(II) sulfate.

Complete the equation for this reaction.

You should balance the equation.

$$CuFeS_2 + \_\_\_\_\_ \rightarrow CuSO_4 + FeSO_4$$

(2)

(b) Calculate the percentage by mass of copper in $CuFeS_2$

Relative atomic masses (A_r): S = 32 Fe = 56 Cu = 63.5

_____

_____

_____

_____

_____

Percentage by mass = _____ %

(3)

(c) Describe a test to show the presence of copper(II) ions in a solution of copper(II) sulfate.

Give the result of the test. **(chemistry only)**

Test _____

_____

Result _____

_____

(2)

(d) Copper can be extracted from low-grade ores by bioleaching.

Describe what is meant by bioleaching. **(HT only)**

_____

_____

_____

_____

(2)

(Total 9 marks)

Q2.

This question is about groups in the periodic table.

The elements in Group 1 become more reactive going down the group.

Rubidium is below potassium in Group 1.

(a) Rubidium and potassium are added to water.

Predict **one** observation you would see that shows that rubidium is more reactive than potassium.

_____

_____

(1)

(b) Explain why rubidium is more reactive than potassium.

_____

_____

_____

_____

_____

_____

(3)

(c) Complete the equation for the reaction of rubidium with water.

You should balance the equation.

$$Rb + H_2O \rightarrow \quad +$$

(3)

The noble gases are in Group 0.

(d) Which is a correct statement about the noble gases?

Tick (✓) **one** box.

The noble gases all have atoms with eight electrons in the outer shell.	☐
The noble gases have boiling points that increase going down the group.	☐
The noble gases have molecules with two atoms.	☐
The noble gases react with metals to form ionic compounds.	☐

(1)

(e) The table below shows information about the three isotopes of neon.

Mass number	Percentage abundance (%)
20	90.48
21	0.27
22	9.25

Calculate the relative atomic mass (A_r) of neon.

Give your answer to 3 significant figures.

_____

_____

_____

_____

_____

Relative atomic mass (3 significant figures) = _____

(3)

(Total 11 marks)